

**Advanced Cleaning
Product
Formulations
Volume 5**

Ernest W. Flick

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ADVANCED CLEANING PRODUCT FORMULATIONS

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Volume 5

Ernest W. Flick



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To
the late Ernie and Jeanne
and
Allyn and Barbara
and
Chris and Rachel

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Preface

This book (Volume 5) presents more than 423 up-to-date advanced cleaning product formulations for household, industrial and automotive applications. It is the result of information received from numerous industrial companies and other organizations. The data represent selections made at no cost to, nor influence from, the makers or distributors of these materials. Only the most recent formulas have been included. All formulations are completely different than those contained in Volumes 1, 2, 3 and 4 published earlier.

Formulation in the cleaning product industry has gradually been undergoing significant change during the past years. Raw materials costs have risen and manufacturers have been reluctant to pass along these increases. Environmental considerations have also played a part. By changing formulations to improve cost/performance characteristics, manufacturers have been able to control costs but still enhance performance. This book presents manufacturers' suggested formulations which might meet new performance criteria.

The formulations in this book are divided into the following sections and chapters, with the number of formulations indicated in ():

- I. Household and Industrial Cleaners and Polishes
 - 1. Bathroom Cleaners (9)
 - 2. Dairy, Food and General Industrial Cleaners (27)
 - 3. Degreasers (9)
 - 4. Dishwashing Detergents (34)
 - 5. General Purpose Cleaners (31)
 - 6. Glass Cleaners/Polishes (12)
 - 7. Hard Surface Cleaners (21)
 - 8. Laundry Products (55)
 - 9. Metal Cleaners and Polishes (72)
 - 10. Oven, Grill and Hot Plate Cleaners (9)
 - 11. Polishes, Coatings and Finishes (6)
 - 12. Rinse Aids (2)
 - 13. Rug, Floor, Carpet, Upholstery Shampoos and Cleaners (33)
 - 14. Miscellaneous (33)

II. Transportation Cleaners and Polishes

15. Auto Cleaners and Polishes (6)
16. Car and Truck Wash Compounds (49)
17. Whitewall Tire Cleaners (3)
18. Miscellaneous (12)

Each formula is located in the chapter which is most applicable. The reader, seeking a formula for a specific end use, should check each chapter which could possibly apply. In addition to the above, there are two other sections which will be helpful to the reader.

III. A chemical trademark section where each tradenamed raw material included in the book is listed with a chemical description and the supplier's name. The specifications which each raw material meets are included, if applicable.

IV. Main office addresses of the suppliers of trademarked raw materials.

Each formulation in the book lists the following information, as available, in the manufacturer's own words:

- Description of end use and most outstanding properties.
- The percent by weight or volume of each raw material included in the formula, rounded to a decimal figure.
- Key properties of the formula, which are the features that the source considers to be more outstanding than other formulations of the same type.
- The formula source, which is the company or organization that supplied the formula. The secondary source may be the originating company and/or the primary source's publication title, or both. A formula number is included, if applicable.

The table of contents is organized in such a way as to serve as a subject index.

My fullest appreciation is expressed to the companies and organizations who supplied the original starting formulations included in this book. I also thank the suppliers of the raw materials included in these formulations, who furnished information describing their trademarked raw materials.

Newburyport, Massachusetts
July 1999

Ernest W. Flick

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NOTICE

To the best of our knowledge the information in this publication is accurate; however, the Publisher does not assume any responsibility or liability for the accuracy or completeness of, or consequences arising from, such information. This book is intended for informational purposes only. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the Publisher. Final determination of the suitability of any information or product for use contemplated by any user. We recommend that anyone intending to rely on any recommendation of materials or procedures mentioned in this publication should satisfy himself as to such suitability, and that he can meet all applicable safety and health standards.

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Section I

Household and Industrial Cleaners and Polishes

1. Bathroom Cleaners

Acidic Toilet Bowl Cleaner

Carbopol resins are used to thicken this acidic toilet bowl cleaner formulation. In addition, the use of the resin provides vertical cling to increase the contact time of the detergent on the soiled surface and enhance consumer convenience.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	43.00
Carbopol 674 (1)	2.00
Citric Acid (50%)	50.00
Alkyl benzene sulfonic acid (97%) (2)	2.00
Sodium dodecyl diphenyloxide disulfonate (45%) (3)	3.00

Brookfield viscosity (RVT-20 rpm): 4,000 cps

Product pH: 1.0-2.0

Product Clarity: Clear

- (1) BFGoodrich
- (2) Stepan Co.: Biosoft S-100
- (3) Dow Chemical Co.: Dowfax 2A1

Procedure:

1. Mix the DI water and citric acid solution together.
2. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the water/citric acid solution. Mix the slurry for approximately 30 minutes. The product will become increasingly thicker with time - heating to 40-50C will hasten the process.
3. Add the sulfonic acid and the diphenyloxide disulfonate surfactant.
4. Add color and fragrance, as desired. Cool the product to room temperature.

Total Actives:

Citric acid: 25.00

Alkyl benzene sulfonic acid: 1.94

Dodecyl diphenyloxide disulfonate: 1.35

SOURCE: BFGoodrich Specialty Chemicals: DET-351

Bathroom Cleaner with Disinfectant

<u>Ingredients:</u>	<u>Wt. %*</u>
A: Veegum T, Magnesium Aluminum Silicate	1.00
Rhodopol 23, Xanthan Gum	0.35
Deionized Water	86.65
B: Diatomaceous Earth (Super Floss)	5.00
Tetrasodium EDTA (Hampene 100)	2.75
Sodium o-Phenylphenate (Dowicide A)	0.25
Sodium Alkylbenzene Sulfonate (Calsoft L-40)	3.00
Butyl Cellosolve	1.00

Procedure:

1. Dry blend the Veegum T and Rhodopol 23 and add them to the water while stirring with an homogenizer at 5000 rpm. Continue mixing for 30 minutes.
2. Slowly add the Part B ingredients in the order shown, mixing each for 5 minutes.

* As received basis

SOURCE: R.T. Vanderbilt Co., Inc.: Formulation No. 363

Heavy Duty Acid Bathroom Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Hydroxyacetic acid	5.0
Sulfamic acid	5.0
Ammonyx LO	10.0
Water, D.I.	80.0

Mixing Procedure:

Add ingredients to water in the order given and mix until homogeneous.

Properties:

Appearance: Clear liquid
pH, as is: 1.0
Solids, %: 14.0
Density, lbs/gal: 8.7

Use Instructions:

Use as is or dilute as needed. Do not use on natural marble or polished aluminum. Use gloves. Do not mix with bleach.

Storage Stability:

Formulation is freeze/thaw stable through 3 cycles.
Formulation is stable for 3 weeks @ 50C.

SOURCE: Stepan Co.: Formulation No. 200

Mildew Remover

<u>Ingredients:</u>	<u>Wt%*</u>
Van Gel O	3.00
Deionized Water	85.55
Sodium Hydroxide, 50% Solution	0.45
Sodium Hypochlorite, 10% Solution (Hypure N)	10.00
Vanseal NALS-30	1.00

Procedure:

1. Slowly sprinkle the Van Gel O into water at room temperature while mixing with a homogenizer or dispenser operating at 5000 rpm. Continue mixing for 40 minutes.
2. Add sodium hydroxide and mix until uniformly dissolved. Slow the mixer to 1000 rpm or less.
3. Add the Vanseal NALS-30. Avoid air entrapment. Mix until uniform.

Formulation No. 458

Bowl/Mildew Cleaner

<u>Ingredients:</u>	<u>Wt%*</u>
A: Veegum T, Magnesium Aluminum Silicate	5.00
Tetrasodium Pyrophosphate (TSPP)	0.25
Water	50.75
B: Sodium Hypochlorite, 5.25%	34.00
Sodium Metasilicate, Anhydrous	10.00

Procedure:

1. Dry blend the Veegum T and TSPP. Slowly add the water while agitating at maximum available shear. Continue until smooth.
2. Add Part B ingredients slowly in the order shown, mixing after each addition until smooth and uniform.

Formulation No. 424

*As received basis

SOURCE: R.T. Vanderbilt Co., Inc.: Suggested Formulations

Tile, Porcelain and Bathroom Cleaner, Acid

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	75.5
Xanthan Gum	0.5
Petro BAF Powder	2.0
Phosphoric Acid, 75%	12.0
Hydroxyacetic Acid, 70%	10.0
Perfume, Dye	q.s.

Blending Procedure:

Add Xanthan Gum slowly to water with high speed mixing. Allow to mix until material thickens. Add remaining ingredients in order listed. If problems develop adding Xanthan Gum to water, premix the Xanthan Gum in some isopropanol before adding to water.

Formula 529

Tub and Tile Cleaner

<u>Ingredient:</u>	<u>Wt%</u>
Water, D.I.	67.4
Phosphoric Acid, 86%	17.6
Hydrochloric Acid, 37%	13.5
Rewoteric AM TEG	0.5
Varonic T202 SR	1.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 293

Solids: 16.3%

pH: 1.7

Formula 530

Hypochlorite Tub and Tile Cleaner and Mildew Stain Remover

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	44.9
Sodium Hydroxide (30%)	1.0
Varox 365	1.5
Sodium Hypochlorite (5.7%)	52.6

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 4

Solids: 3.8%

pH: 13.5

Formula 531

SOURCE: Witco Corp.: Suggested Formulations

Toilet Bowl Cleaner with Bleach

Carbopol resins are used to thicken this toilet bowl with chlorine bleach formulation. In addition, the use of the resin provides vertical cling to increase the contact time of the detergent on the soiled surface and enhance consumer convenience.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	60.75
Carbopol 676 (1)	1.25
Potassium hydroxide (45%)	5.00
2.1r Potassium silicate (39%) (2)	5.00
Potassium carbonate	5.00
Sodium hypochlorite (12.50%)	8.00
Amine Oxide (30%) (3)	10.00

Brookfield viscosity (RVT-20rpm): 2,500 cps

Product pH: 12-13

Product clarity: Opaque

- (1) BFGoodrich
- (2) PQ Corp.
- (3) Lonza, Inc.: Barlox 12

Procedure:

- Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
- With constant agitation, add the potassium hydroxide and the potassium silicate. Mix until homogeneous.
- Continue agitation and add the potassium carbonate followed by the bleach.
- Add the amine oxide surfactant and mix until homogeneous.
- Add color and fragrance, as desired.

Total Actives:

Silicate (as SiO₂): 1.32
 Carbonate (as Na₂CO₃): 3.84
 Available Chlorine: 1.00
 Amine Oxide: 3.00

SOURCE: BFGoodrich Specialty Chemicals: DET-350

2. Dairy, Food and General Industrial Cleaners

Acid Industrial and Household Cleaners
Oxalic Acid Gel

<u>Ingredients:</u>	<u>Wt. %*</u>
Water	53.70
Van Gel B	2.50
Rhodopol 23	0.80
Oxalic Acid Dihydrate, 12.5% Aqueous Solution	40.00
Polysorbate 40 (Tween 40)	3.00

Procedure:

1. Dry blend the Van Gel B and Rhodopol 23 and add them to the water while mixing with a propeller stirrer at 1800 rpm. Continue mixing for 60 minutes.
2. Reduce the stirrer speed to produce a slight vortex and slowly add the oxalic acid solution.
3. When all the acid has been added, add the Polysorbate 40 and mix until uniform.

Formulation No. 466

Rust Removal Jelly

<u>Ingredients:</u>	<u>Wt%*</u>
Water	53.20
Van Gel B	3.00
Rhodopol 23	0.80
Phosphoric Acid, 50% Aqueous Solution	40.00
Octoxynol-9	3.00

Procedure:

1. Dry blend the Van Gel B and Rhodopol 23 and add them to the water while mixing with a propeller stirrer at 1800 rpm. Continue mixing for 60 minutes.
2. Reduce the stirrer speed to produce a slight vortex and slowly add the Phosphoric Acid solution.
3. After all the acid has been added, add the Octoxynol-9 and mix until uniform.

Formulation No. 467

*As received basis

SOURCE: R.T. Vanderbilt Co., Inc.: Suggested Formulations

Cleaners for Industrial Application

Desinfecting Cleaner, Acid

<u>Ingredients:</u>	<u>Wt%</u>
Water	48.0
Phosphoric acid (85%)	24.0
Sulphuric acid (98%)	5.0
Propetal 241	3.0
Dodigen 226	20.0
Formula CT 06-06-01	

Dipping Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	75.5
Tetrapotassium pyrophosphate	10.0
Caustic soda	1.5
Dipropylene glycol monomethyl ether	5.0
Sulfetal 4069	5.0
Zusolat 1008/85	3.0
Formula CT 07-03-01	

Spray Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	58.0
Cublen D50	3.0
Triethanolamine	3.0
Sulfetal 4105	4.0
Propetal 241	2.0
Zusolat 1005/85	0.5
Phosfetal 201	2.0
Butyl glycol	5.0
Citrus terpene	0.5
Inhibitor 4000	22.0
Formula CT 07-06-01	

<u>Ingredients</u>	<u>Wt%</u>
Water	86.0
Sulfetal 4105	6.0
Propetal 99	3.0
Zusolat 1005/85	0.5
Butyl glycol	4.0
Orange terpene	0.5
Formula CT 07-06-03	

SOURCE: Zschimmer & Schwarz GmbH & Co.: General Formulations

Destainer
(Phosphate, Powder)

Soil-Organic stains: food, mold and grass
 Surface-Cement, wood, paint, polymeric
 Application Method-Brush
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
*STPP	25.0
Metso Beads 2048	25.0
Sodium Sulfate	8.0
PQ Epsom Salt	2.0
**Octylphenoxy Polyethoxyethanol, 9-10 Moles EO	2.0
Sodium Perborate, Monohydrate	38.0

Use Dilution: 2.3-4.5% bw (3-6 oz/gallon)

- * FMC
- ** Rhone Poulenc Igepal CA-630

Destainer
(Reduced Phosphate, Powder)

Soil-Organic stains: food, mold and grass
 Surface-Cement, wood, paint, polymeric
 Application Methods-Brush
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
*STPP	10.0
Metso Beads 2048	25.0
Sodium Sulfate	8.0
PQ Epsom Salt	2.0
**Octylphenoxy Polyethoxyethanol, 9-10 Moles EO	2.0
Valfor 100 Zeolite A	15.0
Sodium Perborate, Monohydrate	38.0

Use Level: 3-6 oz/gallon

- * FMC
- ** Rhone-Poulenc Igepal CA-630

SOURCE: PQ Corp.: Detergent Formulation Guide

Egg Cleaner
(Zero phosphate, powder)

Soil-Protein
Surface-Egg and egg handling equipment
Application Method-High pressure spray (700-1400 psi)
Manufacture-Dry blend

<u>Composition:</u>	<u>Wt%</u>
Sodium Carbonate	30.0
Metso Beads 2048	20.0
Sodium Sulfate	12.0
Valfor 100 Zeolite A	30.0
*Sodium Dichloroisocyanurate 2H2O	3.0
**Sodium Alkylaryl Sulfonate Powder (90%)	5.0

Use Dilution: 0.75-1.5% bw (1-2 oz/gallon)

* Olin Chemical
** Witco

Baking Pan Cleaner
(Phosphate, Powder)

Soil-Animal fat and grease, vegetable oil
Surface-Aluminum and steel
Application Method-Immersion/brush
Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
*Sodium Carbonate	35.0
*STPP	12.0
**Nonylphenoxy Polyethoxyethanol, 9-10 Moles EO	3.0
Metso Pentabead 20	50.0

Use Dilution: 1.5% bw (2 oz/gallon)

* FMC
** Rhone-Poulenc Igepal CO-630

SOURCE: PQ Corp.: Detergent Formulation Guide

Heavy Duty Cleaners
All Purpose-Food Process Plant

<u>Ingredients:</u>	<u>Weight%</u>
Water	74.00
EDTA (Ethylenediaminetetracetic Acid)	2.00
TKPP (Tetra Potassium Pyrophosphate)	4.00
Pilot SXS-40	5.00
KOH, 45%	10.00
Calamide C	5.00

Comments about this formula:

1. Add ingredients in order listed.
 2. Water and EDTA give a milky white solution.
 3. Upon adding the other ingredients the solution is clear.
 4. EDTA can be substituted with Na4EDTA to make a clear final solution.
 5. This is a heavy duty cleaner for food processing plants.
 6. Use level. 2-4 oz per gallon.
- Formulation HDC-004-01

Hard Surface Spray Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Water	89.00
TKPP (Tetra Potassium Pyrophosphate)	1.00
Ethylene Glycol Monobutyl Ether	3.00
Calsuds 81	4.00
NH4OH, 28%	3.00

Comments about this formula:

1. Ingredient Water and TKPP when mixed are clear.
 2. Hazy solution when Ethylene Glycol Monobutyl Ether is added.
 3. With the addition of Calsuds 81 the solution turns clear and has a pH of 9.
 4. When NH4OH is added, the pH increases to 12.
- Formulation HDC-002-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

High Foaming Alkaline Cleaner

Monateric EH contributes to detergency and effectively controls both the krafft and cloud point in this high foaming formulation.

<u>Ingredients:</u>	<u>Wt%</u>
Water	76.0
Sodium Hydroxide (50%)	10.0
Sodium Metasilicate (Pentahydrate)	2.0
Dodecylbenzenesulfonic acid	2.0
Monateric EH	8.0
Nonoxynol-10	2.0

Procedure:

Add ingredients in the order listed with agitation. Package.
 Recommended Use Dilution: 1:20 with water
 Formulation F-768

Heavy Duty Alkaline Degreaser

Monateric EH aids in the removal of oily soils without emulsification. It easily displaces oily soils from hard surfaces and keeps them from redepositing.

<u>Ingredients:</u>	<u>Wt%</u>
Water	65.0
Sodium Hydroxide (50%)	20.0
Sodium Metasilicate (Pentahydrate)	3.0
Monateric EH	10.0
Nonoxynol-10	2.0

Procedure:

Add ingredients in the order listed with agitation. Package.
 Recommended Use Dilution: 1:20 with water.
 Formulation F-769

Steam Cleaner

Mona NF-20 contributes the non-foaming and detergency properties in this formulation.

<u>Ingredients:</u>	<u>Wt%</u>
Water	65.00
Potassium Hydroxide	3.00
Sodium Metasilicate (Anhydrous)	10.00
Tetrapotassium Pyrophosphate	10.00
Mona NF-20	12.00

Procedure:

Add ingredients in the order listed with agitation.

Typical Properties:

Cloud Point: 75C

Krafft Point: <0C

Recommended Use Dilution: 4-6 oz./gal.

Formulation F-762

SOURCE: Mona Industries, Inc.: Suggested Formulations

Industrial and High Pressure Cleaners
Cleaner, Strongly Alkaline

<u>Ingredients:</u>	<u>Wt%</u>
Water	76.5
Cublen D 50	1.0
Tetrapotassium pyrophosphate	4.0
Caustic soda	0.6
Sodium metasilicate	4.9
Sulfetal 4105	4.0
Zusolat 1008/85	2.0
Phosfetal 201	2.0
Butyl glycol	5.0
Formula CT 06-13-01	

Cleaner, Weakly Alkaline

<u>Ingredients:</u>	<u>Wt%</u>
Water	80.4
Cublen D 50	1.0
Tetrapotassium pyrophosphate	2.0
Triethanolamine	3.6
Sulfetal 4105	4.0
Zusolat 1008/85	2.0
Phosfetal 201	2.0
Butyl glycol	5.0
Formula CT 06-13-02	

Cleaner, Strongly Alkaline (Phosphate-Free)

<u>Ingredients:</u>	<u>Wt%</u>
Water	80.5
Cublen D50	1.0
Sodium metasilicate	4.9
Caustic soda	0.6
Sulfetal 4105	4.0
Zusolat 1008/85	2.0
Phosfetal 201	2.0
Butyl glycol	5.0
Formula CT 06-13-03	

Cleaner, Weakly Alkaline (Phosphate-Free)

<u>Ingredients:</u>	<u>Wt%</u>
Water	80.4
Cublen D 50	1.0
Trisodium citrate	2.0
Sulfetal 4105	4.0
Zusolat 1008/85	2.0
Phosfetal 201	2.0
Butyl glycol	5.0
Triethanolamine	3.6
Formula CT 06-13-04	

SOURCE: Zschimmer & Schwarz GmbH & Co.: General Formulations

Metal Cleaner
(Liquid)

Soil-Petroleum and animal oil and grease
Surface-Metal: Steel
Application Method-Immersion
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	65.6
Star Sodium Silicate	15.6
Sodium Hydroxide (50%)	6.3
*Phosphate Ester	5.0
**Liquid Nonionic Surfactant (C9-C11; 6 Moles EO)	7.5

Use Dilution: 2%-5% bv

- * Rhone-Poulenc Rhodafac RE-610
- ** Rhone-Poulenc Rhodasurf 91-6

Food Industry Cleaner
(Liquid)

Soil-Heavy food grease, oil and protein
Surface-Metal, ceramic, polymeric, glass
Application Method-Wipe, mop or brush
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	74.0
TKPP (60%)	3.0
N Clear Sodium Silicate	7.0
Sodium Hydroxide (50%)	3.5
*Phosphate Ester	2.5
**Ethylene Glycol n-Butyl Ether	5.0
***Liquid Nonionic Surfactant (C12-C13; 6.5 Moles EO)	5.0

Use Dilution: 6-12% bw (8-16 oz/gallon)

- * Rhone-Poulenc Rhodafac RE-600
- ** Dow Chemical, Union Carbide
- *** Rhone-Poulenc Rhodasurf LA-7

SOURCE: PQ Corp.: Detergent Formulation Guide

Milk Can Cleaner
(Phosphate, Powder)

Soil-Fat and protein
 Surface-Metal
 Application Method-Wipe or brush
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
*STPP	30.0
Metso Beads 2048	30.0
*Sodium Carbonate	35.0
**Sodium Dichloroisocyanurate, 2H ₂ O	3.0
***Sodium Alkylaryl Sulfonate Powder, (90%)	2.0

Use Dilution: 0.75-1.5% bw (1-2 oz/gallon)

* FMC
 ** Olin Chemical
 *** Witco

Milk Can Cleaner
(Zero Phosphate, Powder)

Soil-Fat and protein
 Surface-Metal
 Application Method-Wipe or brush
 Manufacture-Dry blend

<u>Composition:</u>	<u>Wt%</u>
Valfor 100 Zeolite A	20.0
Metso Pentabead 20	40.0
Sodium Carbonate	35.0
*Sodium Dichloroisocyanurate, 2H ₂ O	3.0
**Sodium Alkylaryl Sulfonate Powder, (90%)	2.0

Use Level: 1-2 oz/gallon

* Olin Chemical
 ** Stepan, Witco

SOURCE: PQ Corp.: Detergent Formulation Guide

Powdered Enzyme Presoaks
Economy Presoak

<u>Component:</u>	<u>Wt%</u>
Soda Ash	80.0
Sodium Metasilicate Pentahydrate	10.0
Sodium Dodecylbenzenesulfonate Powder	5.0
Burcosperse AP Powder	3.0
Burcotase EP-60	2.0

Premium Presoak

<u>Component:</u>	<u>Wt%</u>
Soda Ash	40.0
STPP	35.0
Neodol 25.7	5.0
Sodium Metasilicate Pentahydrate	10.0
Sodium Dodecylbenzenesulfonate Powder	5.0
Burcosperse AP Powder	3.0
Burcotase EP-60	2.0

The recommended use concentration of these products is 1-4 g/l in the presoak bath. For optimum results, the presoak temperature should be 130-150F.

Enzyme Prespotter for Oily/Smutty Soils

<u>Component:</u>	<u>Wt%</u>
Water	49.0
Propylene Glycol	10.0
Dodecylbenzenesulfonic Acid	10.0
TEA-85	20.0
Burco TME	5.0
Nonionic Surfactant*	5.0
Burcotase LL-100	1.0

*An HLB of 9.5-10.0 is preferred. Alcohol ethoxylates are preferred.

Add components in the order listed. Blend until uniform between each addition. Cool before adding the enzyme.

SOURCE: Burlington Chemical Co., Inc.; Suggested Formulations

Sanitizing Cleaner
(Phosphate, Powder)

Soil-Hospital soil: sebum, blood, urine, etc.
 Surface-Metal, ceramic, polymeric
 Application Method-Wipe or brush
 Manufacture-Dry Blend

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	20.0
*Sodium Carbonate	35.0
*STPP	30.0
**Sodium Dichloroisocyanurate, 2H ₂ O	10.0
***Sodium Alkylaryl Sulfonate Powder (99%)	5.0

Use Dilution: 0.75-1.5% bw (1-2 oz/gallon)

* FMC
 ** Olin Chemical
 *** Witco

Sanitizing Agent
(Phosphate, Powder)

Soil-Hospital soil: sebum, blood, urine, etc.
 Surface-Metal, ceramic, polymeric
 Application Method-Wipe, brush
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
*STPP	30.0
*Sodium Carbonate	25.0
**Liquid Nonionic Surfactant (C12-C16; 12 Moles EO)	10.0
Metso Pentabead 20	30.0
Quaternary Germicide	5.0

Use Dilution: 0.75-1.5% bw (1-2 oz/gallon)

* FMC
 ** Rhone-Poulenc Rhodasurf LA-12

SOURCE: PQ Corp.: Detergent Formulary Guide

3. Degreasers

Aqueous Degreaser

<u>Ingredients:</u>	<u>Weight%</u>
Water	60.80
NaOH, 50%	2.00
Calsoft LAS-99	9.40
Pilot SXS-40	8.70
Caloxylate N-9	4.60
TKPP (Tetra Potassium Pyrophosphate)	4.70
Sodium Metasilicate	6.60
Ethylene Glycol Monobutyl Ether	3.20

Comments about this formula:

Dissolve the salts in the water first.

Formulation DEG-001-01

**Aqueous Degreaser
d-Limonene Microemulsion**

<u>Ingredients:</u>	<u>Weight%</u>
d-Limonene	9.90
Calsuds CD-6	9.80
Calimulse PRS	2.44
Diethylene Glycol n-Butyl Ether	4.93
Water	73.00

Comments about this formula:

1. Additional Calsuds CD-6 may be needed to clarify the sample.

2. Add the water slowly.

Formulation DEG-002-01

Water Based Degreaser

<u>Ingredients:</u>	<u>Weight%</u>
Water	68.50
NaOH, 50%	2.00
Calsoft LAS-99	7.00
Pilot SXS-40	7.50
Na4EDTA	2.00
Caloxylate N-9	5.00
Ethylene Glycol Monobutyl Ether	3.00
Sodium Metasilicate	5.00

Comments about this formula:

1. There is a phosphate version where 3.5% sodium triphosphate is substituted for the sodium metasilicate and Na4EDTA.

2. Use water to balance ingredients.

Formulation DEG-006-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

Degreaser Concentrate
(Liquid)

Soil-Grease, oil
Surface-Paint, polymeric, metal
Application Method-Spray or wipe
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	67.0
Metso Beads 2048	8.0
*Sodium Polyacrylate (40%)	5.0
**Phosphate Ester	10.0
***Liquid Nonionic Surfactant (C9-C11; 6 Moles EO)	5.0
****Liquid Nonionic Surfactant (C9-C11; 2.5 Moles EO)	5.0

Use Dilution: Normal Duty-1.5% bw (2 oz/gallon)
Heavy Duty-3.0% bw (4 oz/gallon)

* Rhone-Poulenc Colloid 226/35 Polyacrylate (40%)
** Rhone-Poulenc Rhodafac RE-610
*** Rhone-Poulenc Rhodasurf 91-6
**** Rhone-Poulenc Rhodasurf A-24

Metal De-Oiling Liquid Concentrate
(Liquid)

Soil-Petroleum-based oil
Surface-Metal: Steel, copper, aluminum, etc.
Application Method-Spray and/or immersion
Manufacture: Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	42.0
Starso Sodium Silicate	12.0
EDTA, Tetrasodium (37%)	16.0
Sodium Xylene Sulfonate (40%)	20.0
*Liquid Nonionic Surfactant (C9-C11; 6 Moles EO)	3.0
**Liquid Nonionic Surfactant (C9-C11; 2.5 Moles EO)	7.0

Use Dilution: 2%-4% bv

* Rhone-Poulenc Rhodasurf 91-6
** Rhone-Poulenc Rhodasurf A-24

SOURCE: PQ Corp.: Detergent Formulation Guide

Solvent Degreaser

Carbopol resins are used to emulsify and stabilize this d-limonene oil based emulsion. In addition, the use of the resin provides vertical cling to increase the contact time of the detergent on the soiled surface and enhance consumer convenience.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	81.18
Carbopol ETD 2623 (1)	0.32
d-Limonene (2)	10.00
Propylene glycol methyl ether (3)	2.00
Alkylbenzene sulfonic acid (4)	2.00
C12-13 linear alcohol, 6.5 moles EO (5)	1.50
Isopropanol	2.50
Sodium hydroxide (50%)	0.50

Brookfield viscosity (RVT-20 rpm): 750 cps

Product pH: 9.5-10

Product Clarity: Opaque

- (1) BFGoodrich
- (2) Arylessence, Inc.: H-7892 d-limonene
- (3) Dow Chemical: Dowanol PM
- (4) Stepan Co.: Biosoft S-100
- (5) Shell Chemical: Neodol 23-6.5

Procedure:

- Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
- Add the d-limonene with good agitation and mix until homogeneous.
- Reduce agitation and add the glycol ether, sulfonic acid, and alcohol ethoxylate.
- Add the isopropanol.
- Add the sodium hydroxide until the target pH range is reached.
- Add color, as desired.

Total Actives:

d-limonene:	10.0
Propylene glycol methyl ether:	2.0
Sodium alkylbenzene sulfonate:	2.2
Isopropanol:	1.5
C12-13 linear alcohol, 6.5 moles EO:	2.5

SOURCE: BFGoodrich Specialty Chemicals: DET-330

Solvent Based Degreaser

<u>Ingredients:</u>	<u>Weight%</u>
Kerosene	72.85
Aristonate M	3.00
Pine Oil	10.00
Tall Oil Fatty Acid	10.06
Caloxylate N-9	3.02
Hexylene Glycol	1.06

Comments about this formula:

1. Use a low odor grade of tall oil fatty acid.
2. Add ingredients in the order indicated.
3. Aristonate L can be substituted for Aristonate M.
Formulation DEG-004-01

Solvent Based Degreaser

<u>Ingredients:</u>	<u>Weight%</u>
Aristonate M	5.10
Triton X-45	5.00
Triton N-101	2.99
Kerosene	86.93

Comments about this formula:

1. Kerosene can be substituted with Aromatic Naphtha.
2. Aristonate M can be substituted with Aristonate L.
Formulation DEG-003-01

Engine Cleaner and Degreaser

<u>Ingredients:</u>	<u>Weight%</u>
Water	58.94
MIPA	20.33
Calimulse PRS	5.08
Dowanol DPM	15.24
Na4EDTA	0.41

Comments about this formula:

Clear, pale yellow product.
Formulation DEG-005-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

4. Dishwashing Detergents

Automatic Dishwash Detergent-Consumer
(Zero Phosphate, Chlorine Free, Powder)

Soil-Food grease, oil and protein
 Surface-Metal, glass, plastic and ceramic
 Application Method-Dishwasher (spray)
 Manufacture-Dry Blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Citrate Dihydrate	10.0
*Britesil H2O Hydrous Polysilicate	20.0
Sodium Carbonate	23.0
**Liquid Nonionic Surfactant (3 moles EO)	3.0
***Acusol 445ND Sodium Polyacrylate (92% solids)	4.0
****Sodium Perborate Monohydrate	10.0
Valfor 100 Zeolite A	15.0
Sodium Sulfate	15.0
* 2.0 weight ratio powder with 17.5% water	
** Rhone-Poulenc Antarox BL-330	
*** Rohm & Haas; or use a combination of Acusol 445ND and Acusol 479ND (2 wt. % each)	
**** Or use Sodium Dichloroisocyanurate bleach (contains chlorine) at 2 wt%. Balance with sulfate.	

Automatic Dishwash Detergent-Consumer
(Phosphate, Chlorine Free, Powder)

Soil-Food grease, oil and protein
 Surface-Metal, glass, plastic and ceramic
 Application Method-Dishwasher (spray)
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
RU Liquid Sodium Silicate	15.0
*Sodium Carbonate	23.0
**Liquid Nonionic Surfactant (3 moles EO)	3.0
***Acusol 445ND Sodium Polyacrylate (92% solids)	4.0
****Sodium Perborate Monohydrate	10.0
*STPP	30.0
Sodium Sulfate	15.0
* FMC	
** Rhone-Poulenc Antarox BL-330	
*** Rohm & Haas; Or use a combination of Acusol 445ND and Acusol 479ND (2 wt.% each)	
**** Or use Sodium Dichloroisocyanurate bleach (contains chlorine) at 2 wt %. Balance with sulfate.	

SOURCE: PQ Corp.: Detergent Formulation Guide

Automatic Dishwash Detergent-Industrial & Institutional
(Phosphate, Solid Block)

Soil-Food grease, oil and protein
 Surface-Metal, glass, plastic and ceramic
 Application Method-Dishwasher (spray)
 Manufacture-Solid block

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	25.0
NaOH (50% Solution)	25.0
*STPP	35.0
*Sodium Carbonate	12.0
**Liquid Nonionic Surfactant (7-9 Moles EO; C12-15)	3.0
* FMC	
** Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7	

Automatic Dishwashing Detergent-Industrial & Institutional
(Liquid)

Soil-Food grease, oil and protein
 Surface-Metal, ceramic and glass
 Application Method-Dishwasher (spray)
 Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	50.9
*Acrysol ASE 108 (Acrylic Polymer)	6.9
**Triton DF-16 (Nonionic Surfactant)	3.0
Potassium Hydroxide (45%)	1.2
TKPP (60%)	25.0
N Clear Sodium Silicate	13.0

Use Dilution: 0.15-0.30% bw (0.2-0.4 oz/gallon)

- * Rohm & Haas; or Rhone-Poulenc Colloid 226/35 Polyacrylate(40%)
- ** Rohm & Haas; or Rhone-Poulenc Antarox BL-330

SOURCE: PQ Corp.: Detergent Formulation Guide

Automatic Dishwash Detergent-Industrial & Institutional
(Zero-Phosphate, Chlorine Free, Powder)

Soil-Food grease, oil and protein
 Surface-Metal, glass, plastic and ceramic
 Application Method-Dishwasher (spray)
 Manufacture-Dry Blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Pentabead 20	30.0
Sodium Carbonate	26.0
*Liquid Nonionic Surfactant (7-9 Moles EO; C12-15)	3.0
**Acusol 445ND Sodium Polyacrylate (92% solids)	4.0
***Sodium Perborate Monohydrate Bleach	10.0
Valfor 100 Zeolite A	15.0
Sodium Sulfate	12.0
* Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7	
** Rohm & Haas; Or use a combination of Acusol 445ND and Acusol 479ND (2 wt% each).	
*** Or use sodium dichloroisocyanurate bleach (contains chlorine) at 2 wt%. Balance with sulfate.	

Automatic Dishwash Detergent-Industrial & Institutional
(Phosphate, Chlorine Free, Powder)

Soil-Food grease, oil and protein
 Surface-Metal, glass, plastic and ceramic
 Application Method-Dishwasher (spray)
 Manufacture-Dry Blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Pentabead 20	30.0
*STPP	25.0
*Sodium Carbonate	28.0
**Liquid Nonionic Surfactant (7-9 Moles EO; C12-15)	3.0
***Acusol 445ND Sodium Polyacrylate (92% solids)	4.0
****Sodium Perborate Monohydrate Bleach	10.0
* FMC	
** Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7	
*** Rohm & Haas; Or use a combination of Acusol 445ND and Acusol 479ND (2 wt% each)	
**** Or use sodium dichloroisocyanurate bleach (contains chlorine) at 2 wt%. Balance with sulfate.	

SOURCE: PQ Corp.: Detergent Formulation Guide

Automatic Dishwashing Gel with Chlorine Bleach

Carbopol resins are used to thicken the product to reduce splashing, provide cup retention in the dishwasher, and create a stable suspension of insolubles (i.e. phosphate builders) in this ADL formulation containing chlorine bleach.

<u>Ingredient:</u>	<u>Wt%</u>
DI water	44.75
Carbopol 672 (1)	1.25
Potassium hydroxide (45%)	5.00
2.1r potassium silicate (39%) (2)	15.00
Potassium carbonate (3)	5.00
Sodium tripolyphosphate (4)	20.00
Sodium hypochlorite (12.50%)	8.00
Sodium n-decyl diphenyloxide disulfonate (45%) (5)	1.00

Brookfield viscosity (RVT-20 rpm): 15,000 cps

Product pH: 12-13

Product clarity: Opaque

- (1) BFGoodrich
- (2) The PQ Corp.
- (3) Armand
- (4) FMC Corp.
- (5) Dow Chemical: Dowfax 3B2

Procedure:

1. Use a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations. Screen the Carbopol resin into the vortex of the rapidly agitating water (800 rpm). Allow to mix until homogeneous and free of polymer lumps.
2. Add in the potassium hydroxide and potassium silicate. Mix until homogeneous. The product will become very thick at this point.
3. Add the potassium carbonate and phosphate. Mix until there are no more phosphate particles. Heating to 50-60C will speed this process.
4. Add the bleach and then the surfactant. Mix until homogeneous. Adjust the pH to 12-13 using KOH. Do not use acid to reduce the pH, especially after the addition of the bleach.
5. Add color and fragrance, as desired. Cool the product to below 30C to avoid excessive bleach decomposition.

Total Actives:

Phosphorous content:	5.0
Silicate (as SiO ₂):	3.9
Carbonate (as Na ₂ CO ₃):	3.8
Available chlorine:	1.0

SOURCE: BFGoodrich Specialty Chemicals: DET-100

Clear, Colorless Manual Dish Wash

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	57.5
Witcolate ES-3	31.2
Rewoteric AM B-14	5.0
Ethanol	3.0
Sodium Chloride	3.3

Blending Procedure:

Blend ingredients in the order listed. Dissolve completely between each addition.

Comment:

Rewoteric AM B-14: Grease cutter and foam booster.
Formula 132

Powder Stainless Silverware Pre-Soak

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Carbonate (Soda Ash)	67.0
Petro BAF Powder	5.0
DeSonic 11N	11.0
Trisodium Phosphate, Anhydrous	2.0
Caustic Soda Beads	25.0

Blending Procedure:

Blend ingredients in the order listed.

Use Dilution: 1 oz/gal

Formula 127

Low Alkaline Warewashing Block

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	16.0
R.U. Silicate	29.0
DeSonic LFD-97	2.0
Sodium Carbonate (Soda Ash)	23.0
Sodium Tripolyphosphate Code 185	30.0

Blending Procedure:

Blend ingredients in the order listed. When slurry is produced, pour into molds and allow to harden.

Formula 129

SOURCE: Witco Corp.: Suggested Formulations

Dish Washing Agents
 clear, liquid, 25% WAS
 alkanesulphonate:ethersulphate=4:1

<u>Ingredients:</u>	Wt%
A: Hostapur SAS 60	33.30
Genapol ZRO liquid	17.90
B: Water	48.50
Preservative	0.10
Dye	q.s.
Perfume	0.20

Tests:
 Viscosity (mPas): 75
 Cloud point: <-5C

<u>Ingredients:</u>	Wt%
A: Hostapur SAS 60	33.30
Genapol ZRO liquid	17.90
B: Water	47.50
Preservative	0.10
Dye	q.s.
Perfume	0.20
Genagen LAB	1.00

Tests:
 Viscosity (mPas): 100
 Cloud point: <-5C

<u>Ingredients:</u>	Wt%
A: Hostapur SAS 60	33.30
Genapol ZRO liquid	17.90
B: Water	44.50
Preservative	0.10
Dye	q.s.
Perfume	0.20
Genagen LAB	4.00

Tests:
 Viscosity (mPas): 230
 Cloud point: <-5C

Manufacturing:
 One after another, the components of B are added to A.

SOURCE: Hoechst Aktiengesellschaft: Suggested Formulations

Dish Washing Agents
Clear, liquid, 30% WAS
alkanesulphonate:ethersulphate=4:1

<u>Ingredients:</u>	<u>Wt%</u>
A: Hostapur SAS 60	40.00
Genapol ZRO liquid	21.40
B: Water	37.30
Preservative	0.10
Dye	q.s.
Perfume	0.20
Genagen LAB	1.00

Tests:
 Viscosity (mPas): 380
 Cloud point: <-5C

<u>Ingredients:</u>	<u>Wt%</u>
A: Hostapur SAS 60	40.00
Genapol ZRO liquid	21.40
B: Water	37.30
Preservative	0.10
Dye	q.s.
Perfume	0.20
Hoe S 3924	1.00

Tests:
 Viscosity (mPas): 420
 Cloud point: <-5C

<u>Ingredients:</u>	<u>Wt%</u>
A: Hostapur SAS 60	40.00
Genapol ZRO liquid	21.40
B: Water	34.30
Preservative	0.10
Dye	q.s.
Perfume	0.20
Hoe S 3924	4.00

Tests:
 Viscosity (mPas): 610
 Cloud point: <-5C

Manufacturing:
 One after another, the components of B are added to A.

SOURCE: Hoechst Aktiengesellschaft: Suggested Formulations

Dish Wash w/Amine Oxide/LABS/SLES

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	66.3
Witconate 1240	10.3
Varox 1770	5.3
Witcolate SE-5	18.1

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition. Add ethanol as needed to lower viscosity.

Typical Properties:

Viscosity, cps: 620
Solids: 16.8%
pH: 9.12
Formula 117

Dish Wash w/Amine Oxide/LABS/ALES

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	70.0
Witconate 1240	13.8
Varox 1770	3.1
Witcolate LES-60A	8.2
Ethanol	5.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition. Acidify with Citric Acid to pH=6.5.

Typical Properties:

Viscosity, cps: 4
Solids: 10.1%
pH: 6.68
Formula 118

Hand Dishwashing Liquid

<u>Ingredients:</u>	<u>Wt%</u>
Water	60.0
Witconate AOS	26.0
Witcamide 128T	4.0
Witcolate LES-60C	10.0

Blending Instructions:

Add all ingredients in the order listed, mixing well between additions.

Formula 106

SOURCE: Witco Corp.: Suggested Formulations

Foam Booster: E-14-5 in Hand Dishwashing Liquids

Liquid dish formulators are challenged to produce low cost quality products. Hand dish detergents are expected to foam in the presence of food soils, cut grease and clean. In addition, aesthetics, skin mildness, and environmental impact are also major product considerations. The following data illustrated how E-14-5 can be used to formulate cost effective products suitable for the various liquid dish soap market segments. Optimized liquid dish detergents containing E-14-5 provide the optimum in cost performance when compared to all other types of foam boosters. Although it performs well alone, E-14-5 synergistically enhances the performance of most traditional foam boosters as illustrated below with Coco diethanolamide.

Economy Formulation

<u>Ingredients:</u>	<u>Wt. %</u>
Deionized water	59.7
Dodecylbenzene sulfonate, sodium salt, (60% solids)	25.9(15)
Lauryl alcohol ether sulfate-4 EO, (60% solids)	8.4(5)
Ethyl alcohol	0
Tomah E-14-5	3
Coco diethanolamide	3

Standard Formulation

<u>Ingredients:</u>	<u>Wt. %</u>
Deionized water	52.9
Dodecylbenzene sulfonate, sodium salt, (60% solids)	31.0(18)
Lauryl alcohol ether sulfate-4EO, (60% solids)	10.1(6)
Ethyl alcohol	1.5
Tomah E-14-5	3
Coco diethanolamide	3

90% Premium Formulation

<u>Ingredients:</u>	<u>Wt. %</u>
Deionized water	38.6
Dodecylbenzene sulfonate, sodium salt, (60% solids)	38.8(22.5)
Lauryl alcohol ether sulfate-4 EO, (60% solids)	12.6(7.5)
Ethyl alcohol	4
Tomah E-14-5	3
Coco diethanolamide	3

Premium Formulation

<u>Ingredients:</u>	<u>Wt. %</u>
Deionized water	28.3
Dodecylbenzene sulfonate, sodium salt, (60% solids)	46.6(27)
Lauryl alcohol ether sulfate-4EO, (60% solids)	15.1(9)
Ethyl alcohol	4
Tomah E-14-5	3
Coco diethanolamide	3

SOURCE: Tomah Products, Inc.: Suggested Formulations

Hand Dish Detergent Formulations Clear Dishwash

<u>Ingredients:</u>	<u>Wt%</u>
Water	12.30
SXS (40%)	8.00
C12 Alfa Olefin sulfonate (28.75% solids)	52.50
Lauryl ether sulfate - 3EO (27.5% solids)	18.20
Tomah AO-728 Special	6.00
NaCl*	3.00

Mixing Instructions:

Add the ingredients in this order.

Mix until homogeneous after each addition.

SpG 20/20C: 1.05

pH: 6

Viscosity: 505 cps (Brookfield LVT 30 rpm spindle number 2)

NOTES: *Add more NaCl to increase viscosity.

Pearlescent Dishwash

<u>Ingredients:</u>	<u>Wt. %</u>
Water	54.40
Dodecylbenzene sulfonate (60% solids)	25.00
Lauryl ether sulfate - 4EO (60% solids)	8.30
Opacifier Latex (40%)*	0.04
Pearlizing Agent (47%)**	2.30
Tomah AO-728 Special	4.00
Tomah Amphoteric L	6.00

Mixing Instructions:

Add the ingredients in this order.

Mix until homogeneous after each addition.

SpG 20/20C: 1.03

pH: 6.5

Viscosity: 1363 cps (Brookfield LVT, 12 rpm, spindle number 2)

NOTES: * Lytron 295 Morton International

** Euperlan PK-771, Henkel

SOURCE: Tomah Products, Inc.: Suggested Formulations

Hand Dishwashing Liquid

Carbopol resins can be used to build rheology in place of using higher surfactant levels. This will improve the skin feel and mildness. Additionally, because of their high yield value, the use of Carbopol resins will increase foam stability.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	38.11
Carbopol ETD 2623 (1)	0.70
5800 MW polyacrylic acid (2)	4.00
Alpha sulfo methyl ester (37%) (3)	27.03
TEA (99%)	5.50
Sodium lauryl ether sulfate (28%) (4)	17.86
Coconut diethanolamide (5)	2.00

Brookfield viscosity (RVT-20 rpm): 400-600 cps

Product pH: 6.0-7.0

Product clarity: Clear

- (1) BFGoodrich
- (2) BFGoodrich: Good-Rite K-7058
- (3) Stepan Co.: Alphastep ML-40
- (4) Henkel Corp.: Standapol ES-3
- (5) Stepan Co.: Ninol 11-CM

Procedure:

1. Use a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations. Preheat the water to 40-50C. Screen the Carbopol resin into the vortex of the rapidly agitating water (800 rpm). Allow to mix for at least 15 minutes or until homogeneous and free of polymer lumps.
2. Add in the low molecular weight polyacrylate with constant mixing.
3. Add in the ASME surfactant with a low level of agitation to avoid excessive foam generation.
4. Add in the TEA, lauryl ether sulfate, and coconut DEA.
5. Adjust the pH using TEA to reach the target range. Add color and perfume, as desired. Cool batch to room temperature.

Total Actives:

Alpha sulfo methyl ester:	10.00
Sodium lauryl ether sulfate:	5.00
Coconut diethanolamide:	2.00
5800 MW polyacrylic acid:	2.00

SOURCE: BFGoodrich Specialty Chemicals: DET-110

Hand Dishwashing Paste

Carbopol resins are used to thicken and suspend insolubles in this hand dishwashing paste. Additionally, because of their high yield value, the use of Carbopol resins will increase the foam stability.

<u>Ingredient:</u>	<u>Wt%</u>
DI water	41.50
Carbopol 672 (1)	1.00
Alkylbenzene sulfonic acid (97%) (2)	17.00
Sodium hydroxide (50%)	5.00
2.4r sodium silicate (52%) (3)	7.50
Sodium tripolyphosphate (4)	15.00
Sodium carbonate	5.00
Sodium olefin sulfonate (40%) (5)	8.00

Brookfield viscosity (RVT-20 rpm): 75,000 cps

Product pH: 10-11

Product clarity: Opaque

- (1) BFGoodrich
- (2) Stepan Co.: Biosoft S-100
- (3) The PQ Corp.
- (4) FMC Corp.
- (5) Stepan Co.: Bioterge AS-40

Procedure:

1. Use a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations. Screen the Carbopol resin into the vortex of the rapidly agitating water (800 rpm). Allow to mix until homogeneous and free of polymer lumps.
2. Add the sulfonic acid with continuous agitation.
3. Add the sodium hydroxide and sodium silicate with continuous agitation. Mix until homogeneous.
4. Slowly, add the phosphate. Mix until homogeneous and free of phosphate particles. Heating the product to 50-60C will speed up this process.
5. Add the sodium carbonate and olefin sulfonate. Mix until homogeneous.
6. Add color and fragrance, as desired.

Total Actives:

Phosphorous content:	3.7
Silicate (as SiO ₂):	2.7
Carbonate (as Na ₂ CO ₃):	5.0
Sodium olefin sulfonate:	3.2
Sodium alkylbenzene sulfonate:	17.6

SOURCE: BFGoodrich Specialty Chemicals: DET-111

Light Duty Liquid, Premium Hand Dishwash

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	30.2
Witcolate SE-5	21.7
Witconate 1260 Slurry	36.7
Witcamide 128T	5.0
Petro LBA Liquid	1.9
Sodium Sulfate	2.6
Ethanol	1.8
Formalin	0.1
Perfume, Dye	q.s.

Blending Procedure:

Blend ingredients in the order listed. Adjust pH to 6.5-7.0 using Citric Acid.

Typical Properties:

Viscosity, cps: 230
 Appearance: Clear Liquid
 Formula 113

Light Duty Liquid Low Cost Hand Dishwash

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	81.5
Witcolate SE-5	5.5
Witconate 1260 Slurry	9.2
Witcamide 128T	1.2
Petro LBA Liquid	0.5
Sodium Chloride	2.0
Formalin	0.1
Perfume, Dye	q.s.

Blending Procedure:

Blend ingredients in the order listed. Adjust pH=6.5-7.0 using Citric Acid.

Typical Properties:

Viscosity, cps: 170
 Appearance: Clear Liquid
 Formula 116

SOURCE: Witco Corp.: Suggested Formulations

Liquid Automatic Dishwasher Detergent

This formulation features Van Gel ES, magnesium aluminum silicate, as a suspending agent and rheology modifier. The sodium hypochlorite functions as a disinfectant, cleaning agent and bleach. Sodium metasilicate adjusts the formula pH. The phosphate blend provides detergency and the surfactants contribute excellent rinsability.

<u>Ingredients:</u>	<u>Wt%</u>
A: Van Gel ES	4.00
Deionized Water	53.00
B: Tetrapotassium Pyrophosphate, technical powder	10.00
Sodium Tripolyphosphate, technical powder	20.00
C: Sodium Metaasilicate. Anhydrous	2.00
Sodium Hypochlorite, 12.5% soln.	8.00
D: Sodium Xylenesulfonate	2.25
Deceth-4-Phosphate	0.75

Procedure:

Preheat the water to 55 to 60C. Hydrate the Van Gel ES slowly by adding it to the available water using a high speed disperser. Preblend B ingredients. Add B to A slowly with mixing. Mix until uniform. Add C ingredients in the order listed, mixing until dissolved. Continue mixing while cooling rapidly to 25C. Finally, combine D ingredients and add while mixing slowly until smooth and uniform (avoid incorporation of air).

Consistency and pH:

Pumpable liquid, Viscosity 1300-1800 cps, Brookfield Model LVT, Spindle 4 at 60 rpm measured at room temperature after 30 days aging; pH approximately 12.5.

Suggested Packaging: Squeeze bottle or pump.

SOURCE: R.T. Vanderbilt Co., Inc.: Formulation No. 438

Manual Dishwashing Gel

Functions & Benefits: Carbopol EX-473:

- *viscosity modifier for high surfactant systems, independent of surfactant type
- *provides high clarity across surfactant level
- *imparts yield value for suspension of, for instance, encapsulated actives
- *ability to post-thicken traditional salt-thickened systems
- *easy-to-use, odorless, liquid form

<u>Ingredient:</u>	<u>Wt%</u>
DI water	37.50
Carbopol EX-473 (30%)*	10.00
Sodium citrate	0.50
Sodium hydroxide (18%)	2.00
Ammonium lauryl sulfate (30%)**	25.00
Sodium lauryl ether sulfate (30%)**	25.00

*Viscosity modifier: BFGoodrich

**Anionic surfactant: Standapol A: Stepan Chemical

***Anionic surfactant: Standapol ES-3: Stepan Chemical

Physical Properties:

Brookfield RVT viscosity-20 rpm: 8,000 cP
 Product pH: 6.5-7.0
 Product clarity: clear

Procedure:

1. Using slow agitation (200 rpm) provided by a Lightnin' mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, add the Carbopol EX-473 resin into the DI water. Mix until uniform and homogeneous.
2. Add the sodium citrate. Mix until the sodium citrate is completely dissolved.
3. Adjust the pH with sodium hydroxide to desired pH.
4. Add the lauryl sulfate and lauryl ether sulfate surfactants with slow mixing to avoid excessive foam generation.
5. Check pH, readjust with additional sodium hydroxide if necessary.
6. Add fragrance and color, as desired.

SOURCE: BFGoodrich Specialty Chemicals: DET-130

Manual Dishwashing Liquid**Functions & Benefits: Carbopol EX-473:**

- *viscosity modifier for high surfactant systems, independent of surfactant type
- *provides high clarity across surfactant level
- *imparts yield value for suspension of, for instance, encapsulated actives
- *ability to post-thicken traditional salt-thickened systems
- *easy-to-use, odorless, liquid form

Ingredient:

	Wt%
DI water	43.00
Carbopol EX-473 (30%)	5.50
Ammonium lauryl sulfate (30%)*	25.00
Sodium lauryl ether sulfate (30%)**	25.00
Sodium citrate	0.50
Sodium hydroxide (18%)	1.00

*Anionic surfactant: Standapol A: Stepan Chemical

**Anionic surfactant: Standapol ES-3: Stepan Chemical

Physical Properties:

Brookfield RVT viscosity-20 rpm: 500 cP

Product pH: 6.5-7.0

Product clarity: Clear

Procedure:

1. Using slow agitation (200 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, add the Carbopol EX-473 resin into the DI water. Mix until uniform and homogeneous.
2. Add the lauryl sulfate and lauryl ether sulfate surfactants with slow mixing to avoid excessive foam generation.
3. Add the sodium citrate. Mix until the sodium citrate is completely dissolved.
4. Adjust the pH with sodium hydroxide.
5. Add fragrance and color, as desired.

SOURCE: BFGoodrich Specialty Chemicals: DET-120

Non-Chlorinated Machine Dishwashing Compound, Liquid

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	79.5
Sodium Tripolyphosphate	2.0
Versene 220, Powder	1.0
Sodium Gluconate	1.0
Sodium Metasilicate, Pentahydrate	7.0
Caustic Soda 50%	8.5
Petro ULF Liquid	1.0

Blending Procedure:

Add all components in the order shown, mixing well between additions.

Formula 109

Chlorinated Machine Dishwashing Compound, Powder

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Carbonate (Soda Ash), Light Density	30.0
Sodium Tripolyphosphate (STPP), Light Density	25.0
DeSonic LFD-97	1.0
Sodium Metasilicate, Anhydrous	30.0
Caustic Soda Beads	10.0
CDB Clearon	4.0

Blending Procedure:

Blend ingredients in the order listed, mixing thoroughly with each addition.

Formula 111

Non-Chlorinated Machine Dishwashing Compound, Powder

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Carbonate (Soda Ash), Light Density	33.0
Sodium Tripolyphosphate (STPP), Light Density	25.0
DeSonic LFD-97	2.0
Sodium Metasilicate, Anhydrous	30.0
Caustic Soda Beads	10.0

Blending Procedure:

Blend ingredients in the order listed, mixing thoroughly with each addition.

Formula 112

SOURCE: Witco Corp.: Suggested Formulations

Premium Hand Dishwashing Detergent

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	6.9
Alpha-Step MC-48	56.0
Steol CS-330	30.0
Ninol 30-LL or Ninol 40-CO	5.6
Sodium Chloride	1.5

Properties:

Appearance: Clear yellow liquid
 pH, as is: 6.5-7.5
 Viscosity @ 25 deg. C, cps: 220
 Solids, %: 39-40
 Density, lbs/gal: 8.8
 Freeze/thaw, 3 cycles: Pass
 Cold storage @ 4 deg. C., 2 weeks: Pass
 Flash point, deg. F: >200

Mixing Procedure:

CHarge water. Add MC-48 and CS-330 and mix. Add 30-LL or 40-CO and mix until homogeneous. Slowly add sodium chloride to thicken. Mix until clear. Adjust pH with sulfuric acid or sodium hydroxide as necessary.

Comment:

The surfactants used in this formulation are derived from oleochemical resources and are biodegradable.

SOURCE: Stepan Co.: Formulation No. 173

Dish Washing Agents for Manual Use

<u>Ingredients:</u>	<u>Wt%</u>
Water	79.0
Lumorol 4154	12.0
Zetesol NL	6.0
Zusolat 1008/85	1.0
Sodium chloride	approx. 2.0
Formulation CT 02-01-04	

<u>Ingredients:</u>	<u>Wt%</u>
Water	76.5
Zetesol 2056	20.0
Amphotensid B 4	2.0
Zusolat 1008/85	1.0
Purton CFD	0.5
Formulation CT-02-01-05	

SOURCE: Zschimmer & Schwarz GmbH & Co.: Suggested Formulations

5. General Purpose Cleaners

Abrasive Cleaner with Bleach

Carbopol resins are used to achieve a stable suspension of the calcium carbonate abrasive particles in the presence of chlorine bleach

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	53.76
Carbopol 674 or 691*	0.80
Good-Rite K-7058 (50%)**	2.00
Sodium hydroxide (50%)	2.80
2.4r sodium silicate (52%)	2.50
Sodium hypochlorite (14%)	7.14
Calcium carbonate***	30.00
Sodium n-decyl diphenyloxide disulfonate (45%)****	1.00

*Suspension aid: BFGoodrich

**Anti-redeposition: BFGoodrich

***Abrasive: White #8 (Georgia Marble)

****Anionic surfactant: Dowfax 3B2 (Dow Chemical)

Physical Properties:

Brookfield RVT viscosity - 20 rpm: 3,960 cp

Product pH: 12-13

Product clarity: Opaque

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add the low molecular weight polyacrylate polymer followed by the sodium hydroxide and sodium silicate. Mix until homogeneous.
3. Reduce agitation speed and add the sodium hypochlorite bleach. (The product will drop in viscosity at this point.)
4. Add the calcium carbonate and finally the surfactant with constant agitation. Mix until homogeneous.
5. Add fragrance, as desired.

SOURCE: BFGoodrich Specialty Chemicals: DET-343

Abrasive Cleaner Without Bleach

Carbopol resins are used in this formulation to achieve a stable suspension of the high loading of calcium carbonate abrasives.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	62.10
Ethanol	2.00
Carbopol 674 (1)	0.60
Sodium hydroxide (50%)	1.00
Sodium bicarbonate	1.20
Calcium carbonate (2)	30.00
C12-15 linear alcohol, 3 moles EO (3)	2.50
Coconut diethanolamide (4)	0.60

Brookfield viscosity (RVT-20 rpm): 4,500 cps

Product pH: 8-10

Product clarity: Opaque

- (1) BFGoodrich
- (2) Georgia Marble Co.: Georgia Marble White #8
- (3) Shell Chemical: Neodol 25-3
- (4) Stepan Co.: Ninol 11-CM

Procedure:

1. Add the ethanol to the water - holding back 10 parts of water for step #3.
2. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water/ethanol mixture. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
3. Prepare a neutralizing solution of the 10 parts of water with the sodium hydroxide and sodium bicarbonate. Add this to the mixture formed above and mix until homogeneous.
4. Add the calcium carbonate, alcohol ethoxylate and coconut DEA. Mix until homogeneous.
5. Add fragrance, as desired.

Total Actives:

Calcium carbonate:	30.0
C12-15 linear alcohol, 3 moles EO:	2.5
Coconut DEA:	0.6

SOURCE: BFGoodrich Specialty Chemicals: DET-340

All Purpose Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Urea	2.00
Na4EDTA	2.00
Water	88.00
29% Ammonia	1.00
Calsoft L-40	5.00
Caloxylate N-9	2.00

Comments about this formula:
 Add ingredients in order listed.
 Formulation APC-001-01

All Purpose Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Na4EDTA	4.00
Water, Perfume	84.00
Dowanol DPnB	4.00
Calsoft L-40	8.00

Comments about this formula:
 Compare to Mr. Clean, a trademark of Proctor & Gamble.
 Formulation APC-002-01

All Purpose Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
d-Limonene	40.00
Calamide C	4.00
Calamide CWT	4.00
Calimulse PRS	10.00
Water	42.00

Comments about this formula:
 1. Add ingredients first and mix.
 2. Add water slowly.
 3. Mix until homogeneous.
 Formulation APC-005-01

All Purpose Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Water	85.00
Calamide CWT	15.00

Comments about this formula:
 Formula thickens effectively.
 Formulation APC-003-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

All Purpose Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Na4EDTA	5.00
Water	77.50
Calamide C	2.50
Calamide CWT	2.50
Pilot SXS-40	2.50
Lauramine Oxide	10.00

Comments about this formula:

Add ingredients in order listed.
Formulation APC-006-01

All Purpose Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Na4EDTA	5.00
Water	76.10
50% NaOH	0.80
Calsoft LAS-99	2.80
Pilot SXS-40	5.30
Calamide C	5.00
Calamide CWT	5.00

Comments about this formula:

Add ingredients in order listed.
Formulation APC-007-01

All Purpose Cleaner - No Rinse

<u>Ingredients:</u>	<u>Weight%</u>
Water	89.00
Calfax 10L-45	3.00
Na4EDTA	3.00
Ethylene Glycol Monobutyl Ether	3.00
Calamide CWT	2.00

Comments about this formula:

Spray as is, then wipe with a paper towel.
Formulation APC-008-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

All-Purpose Cleaner

<u>Composition:</u>	<u>Wt%</u>
Kelzan xanthan gum	0.3
Alipal CD-128	1.7
Gafamide CDD 518	0.5
Butyl Cellosolve	3.5
Sodium Metasilicate	1.7
Trisodium Phosphate	1.0
Water, Perfume	91.3

Procedure:

Prepare water solution of Kelzan xanthan gum by adding the powder slowly to the side of the vortex with constant agitation. Add other ingredients as indicated. For aerosol use, charge with approximately 85 percent concentration and 15 percent Genetron 12.

All-Purpose Disinfectant Cleaner

<u>Composition:</u>	<u>Wt%</u>
Kelzan xanthan gum	0.5
Makon 10	10.0
Sodium Tripolyphosphate	3.0
Versene 100	3.0
Hyamine 10X	1.0
Water	82.5

Procedure:

Prepare water solution of Kelzan xanthan gum by adding the powder slowly to the side of the vortex with constant agitation. Add other ingredients as indicated. For aerosol use, charge with approximately 85 percent concentration and 15 percent Genetron 12.

SOURCE: Monsanto Performance Materials: Kelzan Suggested Formulations

All Purpose Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Rhodaterge SMC	10
STPP	2
Water	88

SOURCE: Rhone-Poulenc Surfactants & Specialties: Suggested Formulations

All Purpose Cleaner w/Amide/Phosphate Ester

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	83.0
Tetrapotassium Pyrophosphate	5.0
Varamide A-10	10.0
Emphos 5AP	2.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 145

Solids: 17.0%

pH: 8.8

Formula 514

All Purpose Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	56.0
Witconate 1260 Slurry	38.5
Witcamide 6445	5.5

Blending Procedure:

Blend ingredients in the order listed.

Typical Properties:

Viscosity, cps: 670

Solids: 33.0%

pH, as is: 9.2

Formula 520

All Purpose Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	90.0
Sodium Tripolyphosphate	2.0
Caustic Soda, 50%	0.5
Witco 1298S	2.0
Witcamide 6445	5.0
Perfume, Dye	q.s.

Blending Procedure:

Blend ingredients in order listed.

Typical Properties:

Specific Gravity: 1.0206

Wt./Gal. lbs.: 8.5

pH, as is: 9.12

Viscosity, cps: 107

Color: Beige

Use Dilution: 1-2 oz./Gal.

Formula 535

SOURCE: Witco Corp.: Suggested Formulations

All Purpose Cleaner Concentrate
(Phosphate, Liquid, Foam)

Soil-Grease and oil
 Surface-Paint, polymeric, metal
 Application Method-Spray
 Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	78.1
Metso Beads 2048	2.4
TKPP (60%)	3.0
*Phosphate Ester	3.0
**Dipropylene Glycol Monomethyl Ether	6.0
***Octylphenoxy Polyethoxyethanol, 9-10 Moles EO	5.0
****Octylphenoxy Polyethoxyethanol, 5 Moles EO	2.5

Use Dilution: Normal Duty-1.5% bw (2 oz/gallon)
 Heavy Duty-2.5% bw (3.3 oz/gallon)
 Tough Duty-as supplied

* Rhone-Poulenc Rhodafac RE-610
 ** Dow, Arco Chemical
 *** Rhone-Poulenc Igepal CA-630
 **** Rhone-Poulenc Igepal CA-520

All Purpose Concentrate
(Phosphate, Liquid)

Soil-Grease and oil
 Surface-Paint, polymeric, metal
 Application Method-Wipe or brush
 Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	78.75
Metso Beads 2048	1.00
TKPP	3.00
Sodium Xylene Sulfonate, 40%	3.50
*Ethylene Glycol n-Butyl Ether	6.00
Pine Oil	0.25
**Liquid Nonionic Surfactant (C12-C13, 6.5 Moles EO)	5.00
***Liquid Nonionic Surfactant (C12-C15, 3 Moles EO)	2.50

Use Dilution: 1.5-3.0% bw (2-4 oz/gallon)

* Dow Chemical, Union Carbide
 ** Rhone-Poulenc Rhodasurf LA-7
 *** Rhone-Poulenc Rhodasurf A-24

SOURCE: PQ Corp.: Detergent Formulation Guide

Calcium Carbonate Abrasive Cleaner Without Bleach

Carbopol resins are used in this formulation to achieve a stable suspension of the high loading of calcium carbonate abrasives.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	62.10
Carbopol ETD 2623 (1)	0.25
Sodium hydroxide (50%)	0.20
C12-15 linear alcohol, 3 moles EO (2)	1.50
Sodium alkyl benzene sulfonate (3)	0.50
Calcium carbonate (4)	30.00

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 7,500 cp

Product pH: 8-10

Product Clarity: Opaque

Raw Material Suppliers:

- (1) BFGoodrich
- (2) Shell Chemical Co.: Neodol 25-3
- (3) Stepan Co.: Nacconol 90G
- (4) Georgia Marble Co.: Georgia Marble White #8

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add the sodium hydroxide to reach target pH. The product will become very thick at this point.
3. Add the alcohol ethoxylate and alkylbenzene sulfonate surfactants. Mix until homogeneous.
4. Add the calcium carbonate. Mix until homogeneous.
5. Add fragrance, as desired.

Total Actives:

Calcium carbonate:	30.00
C12-15 linear alcohol, 3 moles EO:	1.50
Sodium alkylbenzene sulfonate:	0.50

SOURCE: BFGoodrich Specialty Chemicals: DET-341

Citric Acid Cleaner**Functions & Benefits: Carbopol ETD 2623:**

- *Provides low pH thickening via hydrogen bonding with surfactant
- *Imparts yield value for suspension of abrasive particles
- *Provides vertical cling for increased surface contact time
- *Shear thinning rheology for easy dispensing through trigger sprayer or nozzle
- *Easy-to-disperse resin for improved and easier full-scale processing

Ingredient:

	Wt%
DI Water	78.40
Carbopol ETD 2623 Resin*	0.10
C12-15 linear alcohol, 3 moles EO**	5.00
C12-13 linear alcohol, 6.5 moles EO***	2.50
Alkylbenzene sulfonic acid****	2.00
Citric Acid (50%)	12.00

*Viscosity modifier: BFGoodrich

**Nonionic surfactant: Neodol 25-3: Shell Chemical

***Nonionic surfactant: Neodol 23-6.5: Shell Chemical

****Anionic surfactant: Biosoft S-100: Stepan

Physical Properties:

	Storage Temperature	
	25C	50C
Brookfield RVT viscosity-20 rpm:		
Initial:	50cP	50cP
Age-Up Viscosity: Week 2:	170cP	400cP
Week 4:	250cP	600cP
Week 6:	350cP	400cP
Product pH: 1.4		
Product clarity: Translucent		

Procedure:

1. Using a marine blade propeller and rapid agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit, sprinkle the Carbopol ETD 2623 resin into the vortex. Allow to hydrate for 15-20 minutes or until no lumps are present. Warming the deionized water to 30C will decrease the hydration time and improve the dispersibility of the Carbopol powder.
2. Mix the Neodol 25-3 and Neodol 23-6.5 (or warm slightly if needed) to ensure homogeneity. Add with moderate mixing (300 rpm). Allow to mix until uniform and smooth.
3. Add the Biosoft S-100 with moderate (300 rpm) mixing and allow to mix until uniform and smooth.
4. Slowly add the Citric Acid with slow mixing (200 rpm). Mix until smooth and uniform.
5. Add fragrance and color, as desired.

SOURCE: BFGoodrich Specialty Chemicals: DET-352

General Purpose Cleaner
(Consumer Low Alkaline, Non-Phosphate Powder)

Soil-Food (fat and protein), petroleum oil and grease, clay
 and particulate soil
 Surface-Hard surface, i.e., metal, plastic, ceramic, concrete,
 and asphalt
 Application Method-Wipe or Brush
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Carbonate (light density)	30.0
*Britesil C20 Hydrous Polysilicate	10.0
**Liquid Nonionic Surfactant (C12-C15; 9 Moles EO)	15.0
Valfor 100 Zeolite A	30.0
***Acusol 445ND Sodium Polyacrylate (92% Solids)	0.5
Sodium Sulfate	14.5

Use Level: 1-4 oz/gallon

- * 2.0 weight ratio silicate powder, 82.5% solids
- ** Rhone-Poulenc Rhodasurf LA-9
- *** Rohm & Haas

General Purpose Cleaner
(Consumer High Alkaline, Non-Phosphated Powder)

Soil-Food (fat and protein), petroleum oil and grease, clay
 and particulate soil
 Surface-Hard surface, i.e., metal, plastic, ceramic, concrete,
 and asphalt
 Application Method-Wipe or brush
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Sulfate	14.5
Sodium Carbonate (light density)	30.0
*Liquid Nonionic Surfactant (C12-C15; 9 Moles EO)	15.0
Valfor 100 Zeolite A	30.0
Metso Beads 2048	10.0
**Acusol 445ND Sodium Polyacrylate (92% Solids)	0.5

Use Level: 1-4 oz/gallon

- * Rhone-Poulenc Rhodasurf LA-9
- ** Rohm & Haas

SOURCE: PQ Corp.: Detergent Formulation Guide

General Purpose Spray & Wipe Cleaner

Carbopol resins are used to increase the yield value resulting in vertical cling when sprayed on a vertical surface. This "no-drip" action will increase the contact time of the detergent on the soiled surface as well as enhance consumer convenience.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	90.70
Carbopol ETD 2691 (1)	0.20
EDTA (tetra sodium salt)	2.00
Sodium metasilicate, anhydrous	2.30
Propylene glycol methyl ether (2)	3.00
C12-15 linear alcohol, 7 moles EO (3)	1.50

Brookfield viscosity (RVT-20 rpm): 120 cps

Product pH: 12-13

Product Clarity: Clear to hazy

(1) BFGoodrich

(2) Dow Chemical: Dowanol DPM

(3) Shell Chemical: Neodol 25-7

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Under slight agitation, add the EDTA and Metasilicate.
3. Continue agitation and add the glycol ether and alcohol ethoxylate.
4. Add color and fragrance, as desired.

Total Actives:

Propylene glycol methyl ether: 3.0

C12-15 linear alcohol, 7 moles EO: 1.5

SOURCE: BFGoodrich Specialty Chemicals: DET-310

General Purpose Spray & Wipe

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	79.0
Sodium Citrate	2.0
Alpha-Step MC-48	10.0
Stepanol WA-Extra	7.0
Ninol 11-CM	2.0

Mixing Procedure:

Charge water and surfactants and mix. Add sodium citrate and mix until homogeneous.

Typical Properties:

Appearance: Clear colorless liquid
 pH, as is: 9.4
 Viscosity @ 25 deg. C: Very thin
 Solids, %: 10.0
 Density, lbs/gal: 8.54
 Cold storage @ 4 deg. C, 1 day: pass
 Freeze/thaw, 3 cycles: pass

Performance:

Gardner Straight Line Washability Test:
 Commercial Product - 66% soil removed from tiles
 Above formulation - 82% soil removed from tiles
 Above formulation performs better than commercial product.

Use Instructions: Use as is

Comment:

The surfactants used in this formulation are derived from oleochemical resources and are biodegradable.

SOURCE: Stepan Co.; Suggested Formulation No. 575

All-Purpose Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	82.0
Zetesol 2056	14.0
Zusolat 1008/85	4.0

SOURCE: Zschimmer & Schwarz GmbH & Co.; Formulation CT 02-04-02

Hypochlorite Vertical Surface Cleaner

Monatropo 1250 is a hypochlorite stable surfactant that contributes to wetting and foaming characteristics.

<u>Ingredients:</u>	<u>Wt%</u>
Monatropo 1250	2.0
Sodium C14-17 Alkyl Sec Sulfonate (60%)	2.0
Lauramine Oxide (30%)	10.0
Potassium Hydroxide (45%)	15.0
Sodium Tripolyphosphate	5.0
Sodium Hypochlorite (5.25%)	66.0

Procedure:

Add ingredients with agitation.

Typical Properties:

Appearance: Clear yellow liquid

pH: 13

Recommended Use Dilution: 1:10 with water

Formulation F-783

Pump Spray All Purpose Cleaner

A fast action spray and wipe formulation. Surfaces will dry streak-free.

<u>Ingredients:</u>	<u>Wt%</u>
Water	94.0
Monatropo 779 (DEA-Laureth Sulfate)	3.0
Propylene Glycol Butyl Ether	3.0

Procedure:

Add ingredients in the order listed with agitation. Package.

Typical Properties:

Appearance: Clear liquid

Recommended Use Dilution: As is

SOURCE: Mona Industries, Inc.: Suggested Formulations

Liquid Cleanser with Bleach

In this formula Van Gel B is used to suspend the abrasive and to adjust the viscosity. The sodium carbonate buffer helps maintain a pH of about 11, necessary for the stability of the hypochlorite. This liquid cleanser offers the advantage of mildness in use and greater ease and effectiveness on vertical surfaces as compared to powders.

<u>Ingredients:</u>		<u>Wt%</u>
A: Van Gel B		2.25
Water		62.25
B: Diatomaceous Earth		10.00
Sodium carbonate		4.50
Sodium hypochlorite, 5.25% soln.		20.00
Sodium Lauryl Sulfate, 29% soln.		1.00

Procedure:

Slowly add Van Gel B to the water while agitating at maximum available shear. Continue mixing until smooth. Add remaining ingredients in order, mixing well after each addition.

Consistency: Medium viscosity liquid.

Suggested Packaging: Plastic squeeze bottle.

SOURCE: R.T. Vanderbilt Co., Inc.: Formulation No. 391

All Purpose Cleaner
Clear, liquid

<u>Ingredients:</u>		<u>Wt%</u>
A: Hostapur SAS 60		10.0-15.0
Genapol ZRO liquid		0.0- 4.0
Genapol UD-080		1.0- 3.0
B: Water		ad 100.0
Perfume		0.2
Preservative		0.1
Dye		q.s.

Manufacturing:

Add one after another, the components of B to A.

Modern standard formulations are based on alkansulphonates and nonionics.

Ethersulphates are used in rare cases.

Phosphates, sodium carbonate and ammonia are not common any longer.

The above guide formulation covers the common european products.

SOURCE: Hoechst Aktiengesellschaft: Suggested Formulation

Pine Oil Cleaner Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Pine oil	20.0
Ninol 11-CM	9.0
Makon 12	5.0
Ammonyx LO	0.5
Bio-Soft S-100	2.0
Isopropanol	10.0
Water, D.I.	53.5

Mixing Procedure:

Combine pine oil, surfactants and IPA. Mix until clear. Add water slowly while under agitation. Mix until clear.

Properties:

Appearance: Clear yellow liquid

Odor: Pine

Viscosity @ 25C, cps: 50

pH (as is): 8.1

Density lbs/gal: 8.06

Freeze/Thaw (3 cycles): Pass

50 C oven (1 week): Pass

Use Instructions: Dilute 1-2 ozs into one gallon

Performance:

Gardner Straight Line Washability Test:

Above formulation: 73.0% soil removed from tiles

Commercial formulation: 55.5% soil removed from tiles

SOURCE: Stepan Co.: Formulation No. 208

Disinfecting Cleaner, Alkaline

<u>Ingredients:</u>	<u>Wt%</u>
Water	57.5
Citric acid	2.0
Zusolat 1008/85	3.5
Lumoral 4192	5.0
Trilon A liquid	7.0
Lonzabac-1230	25.0
<u>Ingredients:</u>	<u>Wt%</u>
Water	69.0
Disodium tetraborate decahydrate	0.5
Sodium bicarbonate	1.0
Burdac-114	20.0
Zusolat 1008/85	9.5
<u>Ingredients:</u>	<u>Wt%</u>
Water	57.5
Trilon A liquid	7.0
Citric acid	2.0
Sulfetal 4069	5.0
Zusolat 1008/85	3.5
Lonzabac-1230	25.0

SOURCE: Zschimmer & Schwarz GmbH & Co.: Formulations CT 06-09-01, CT 06-09-02, CT 06-09-03

Sodium Bicarbonate Abrasive Cleaner Without Bleach

Carbopol resins are used in this formulation to achieve a stable suspension of the high loading of sodium bicarbonate abrasives.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	44.25
Carbopol ETD 2691 (1)	0.50
Alkyl benzene sulfonic acid (2)	0.75
C12-13 linear alcohol, 6.5 moles EO (3)	2.50
Sodium hydroxide (50%)	2.00
Sodium bicarbonate (4):	
Grade 1:	20.00
Grade 5:	30.00

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 6,000 cp
 Product pH: 8.50
 Product Clarity: Opaque

Raw Material Suppliers:

- (1) BFGoodrich
- (2) Stepan Co.: Biosoft S-100
- (3) Shell Chemical Co.: Neodol 23-6.5
- (4) Church & Dwight

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add the alkylbenzene sulfonic acid followed by the alcohol ethoxylate. Mix until homogeneous.
3. Add the sodium hydroxide. Mix until homogeneous. Adjust pH to 8.50 prior to the next step.
4. With minimal agitation, slowly add the sodium bicarbonate. Mix until smooth, homogeneous, and free of bicarbonate lumps. Re-check pH and adjust, if necessary.
5. Add color and fragrance, as desired.

Total Actives:

Sodium bicarbonate:	50.00
C12-13 linear alcohol, 6.5 moles EO:	2.50
Sodium alkylbenzene sulfonate:	0.90

SOURCE: BFGoodrich Specialty Chemicals: DET-342

6. Glass Cleaners/Polishes

Anti-Fogging, Anti-Static Glass Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	90.0
Isopropyl Alcohol	9.0
Adogen 66	0.1
Varox 365	0.5
Emcol 4500	0.4

Blending Instructions:

Combine ingredients in the order shown and mix thoroughly. If product is hazy, additional Isopropyl Alcohol can be used to clarify the solution. Gently heating can be used to facilitate mixing of the Emcol 4500.

Use Instructions:

Apply finished product to a towellete (Kimwipe, etc.) and wipe onto the glass. Allow to dry.

Product Information:

Product:	Benefit:
Varox 365	Wetting agent, degreaser and detergent
Adogen 66	Anti-static agent
Emcol 4500	Wetting agent, coupler and detergent

This formulation presents a thin barrier between the water vapor (fog, steam, etc.) and the glass which will prevent fogging. The ability to lower the surface tension of the water prevents the clinging of individual water droplets to the glass; therefore light is not scattered as much as it is when passing through individual droplets.

Formula 708

Glass Cleaner, Ready to Use

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	84.9
Petro BAF Liquid	0.1
Isopropanol	10.0
Ethylene Glycol Monobutyl Ether	5.0
Dye	q.s.

Blending Procedure: Blend ingredients in the order listed.

Formula 705

SOURCE: Witco Corp.: Suggested Formulations

Glass Cleaner Concentrate (Non-Ammoniated)

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	7.5
Isopropanol, 99%	82.0
Petro LBA Powder	1.0
Monoethanolamine	0.5
Perfume, Dye	q.s.

Blending Procedure: Blend ingredients in the order listed.

This concentrate should be mixed with nine parts of water to one part cleaner to be ready to use. This product requires a red label.

Formula 702

Glass Cleaner Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	77.0
Petro BAF Liquid	20.0
DeSonic 5N	1.0
Ammonia, 29%	2.0
Dye	q.s.

Blending Procedure: Blend ingredients in the order listed.

Use Dilution: 1 part concentrate to 50 parts water.

Formula 703

Ammoniated Glass Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	94.0
Witcolate 2310	3.0
Butyl Cellosolve	2.0
Aqua Ammonia, 26 Be'	2.0

Blending Procedure: Blend ingredients in the order listed.

Formula 704

SOURCE: Witco Corp.: Suggested Formulations

Glass and Window Cleaner

Carbopol resins are used to increase the yield value resulting in vertical cling when sprayed on a vertical surface. This "no-drip" action will increase the contact time of the detergent on the soiled surface as well as enhance consumer convenience.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	92.45
Carbopol ETD 2623	0.10
Isopropanol	5.00
Ammonium hydroxide	0.20
Alkylbenzene sulfonic acid (97%) (2)	0.25
Propylene glycol methyl ether (3)	2.00

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 200 cp
 Product pH: 9.5-10.0
 Product Clarity: Clear

Raw Material Suppliers:

- (1) BFGoodrich
- (2) Stepan Chemical: Biosoft S-100
- (3) Dow Chemical: Dowanol PM

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add the isopropanol.
3. Add the ammonium hydroxide. Mix until homogeneous.
4. Add the sulfonic acid and glycol ether with minimal agitation to avoid excessive foaming.
5. Add additional ammonium hydroxide, if necessary, to reach the target pH range.
6. Add color and fragrance, as desired.

Total Actives:

Ammonium alkylbenzene sulfonate: 0.30
 Propylene glycol methyl ether: 2.00
 Isopropanol: 5.00

SOURCE: BFGoodrich Specialty Chemicals: DET-300

Household Window Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	89.3
Isopropanol	10.0
Varox 365	0.7
Methylene Blue	q.s.

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 4
Solids: 0.2%
pH: 7.4
Formula 706

Premium Household Window Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	89.4
Isopropanol	10.0
Varox 1770	0.6
Methylene Blue	q.s.

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 4
Solids: 0.23%
pH: 6.2
Formula 707

Glass Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	q.s.
Isopropanol	6.0
Dowanol EB	4.0
Rewoteric AM V	0.85

Blending Procedure:

Blend ingredients in the order shown, mixing thoroughly between each addition.
Formula 709

SOURCE: Witco Corp.: Suggested Formulations

Windows/Glass

Glass Cleaner (Concentrate)

<u>Ingredients:</u>	<u>Weight%</u>
Water	18.04
Ethylene Glycol Monobutyl Ether	21.34
Isopropyl Alcohol	53.30
Ammonia, 29.4%	2.35
Calfoam SLS-30	5.00

Comments about this formula:
 Add ingredients in order listed.
 Formulation WIN-001-01

Windshield Washer Concentrate

<u>Ingredients:</u>	<u>Weight%</u>
Water	47.66
Isopropyl Alcohol	47.30
Calsuds 81	5.10

Comments about this formula:
 Use 4 oz. of the concentrate per gallon.
 Formulation WIN-002-01

Windshield Washer Concentrate (Low VOC)

<u>Ingredients:</u>	<u>Weight%</u>
Water	62.20
Propylene Glycol	33.80
Calsuds 81	4.02

Comments about this formula
 Use level: 2-4 oz per gallon.
 Formulation WIN-003-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

7. Hard Surface Cleaners

Alkaline Hard Surface Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	34.0
Sodium Metasilicate	8.0
Varamide A-83	12.0
Witconate 30DS	40.0
Witconate SXS Liquid	6.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 205
Solids: 34.4%
pH: 12.5
Formula 516

Hard Surface Cleaner Concentrate (All Purpose Type)

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	82.0
Tetraspotassium Pyrophosphate, Anhydrous	10.0
Witcamide 128T	1.0
Emphos 5AP	4.0
Witco 1298SA	3.0

Blending Procedure:

Blend ingredients in order listed, mixing well after each addition.

Typical Properties:

Specific Gravity: 1.085
Wt./Gal. lbs: 9.04
pH, as is: 7.57
Viscosity, cps: 94
3 Freeze/Thaw cycles: Passed
1 Week @ 52C: Passed
4 Weeks Room Temp: Passed
Solids: 17.8%
Appearance: Clear Liquid
Use Dilution: 1-3 oz./gal.
Formula 540

SOURCE: Witco Corp.: Suggested Formulations

Concentrated Hard Surface Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Deodorized Kerosene	25.00
Calamide CWT	16.30
Caloxylate N-9	9.00
Ethylene Glycol Monobutyl Ether	9.00
Water	41.30
Na4EDTA	0.40

Comments about this formula:

Add ingredients in order listed.

Use 1-2 oz per gallon.

Formulation HSC-009-01

Hard Surface Cleaner-Spray

<u>Ingredients:</u>	<u>Weight%</u>
Water	86.50
Ammonia, 29%	3.00
Na4EDTA	0.50
Ethylene Glycol Monobutyl Ether	5.00
Calsuds 81	5.00

Comments about this formula:

1. After addition of Ethylene Glycol Monobutyl Ether, the mixture is cloudy.

2. It becomes clear with the addition of Calsuds 81.

Formulation HSC-008-01

Pine Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Pine Oil	20.00
IPA	10.00
Calamide CWT	9.00
Caloxylate N-9	5.00
Calsoft LAS-99	2.00
Water	54.00

Comments about this formula:

Add ingredients in order listed.

Use at 1-2 oz per gallon.

Formulation HSC-004-01

Pine Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Pine Oil	15.00
Calsuds CD-6	10.00
Caloxylate N-9	8.00
IPA	10.00
Water	57.00

Comments about this formula:

Add ingredients in order listed.

Formulation HSC-007-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

Hard Surface Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Water	75.25
Sodium Metasilicate	2.00
Na4EDTA	2.00
Dowanol PnB	6.00
Pilot SXS-40	9.00
Caloxylate N-9	5.50
Pine Oil	0.25
Comments about this formula:	
Add ingredients in order listed.	
Formulation HSC-001-01	

Hard Surface Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Water	74.50
Sodium Metasilicate	2.00
Na4EDTA	2.00
Pilot SXS-40	7.00
Calimulse PRS	3.00
Dowanol PnB	5.00
Caloxylate N-9	6.50
Comments about this formula:	
Add ingredients in order listed.	
Formulation HSC-002-01	

Hard Surface Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Water	79.30
Sodium Metasilicate	5.20
Na4EDTA	2.50
Pilot SXS-40	5.00
Calamide CWT	8.00
Comments about this formula:	
Add ingredients in order listed.	
Use 1-4 oz per gallon.	
Formulation HSC-005-01	

Hard Surface Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Water	58.50
Sodium Citrate	15.00
Soda Ash	5.00
Ammonia, 29%	3.50
Pilot SXS-40	8.00
Calamide CWT	10.00
Comments about this formula:	
Add ingredients in order listed.	
Use 2-4 oz per gallon.	
Formulation HSC-006-01	

SOURCE: Pilot Chemical Co.: Suggested Formulations

Hard Surface Cleaner w/Amphoteric

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	75.0
Sodium Carbonate	4.0
Rewoteric AM KSF-40	10.0
Dowanol DPM	5.0
Versene 100	2.0
Witconate SXS (40%)	4.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 4
 Solids: 10.2%
 pH: 10.8
 Formula 507

Hard Surface Cleaner Concentrate w/d'Limonene

<u>Ingredients:</u>	<u>Wt%</u>
Phase I:	
Isopropanol	10.0
Oleic Acid	8.8
Varonic K205	5.0
d'Limonene	12.0

Phase II:

Water, D.I.	62.2
Potassium Hydroxide (87%)	2.0

Blending Procedure:

Combine Phase I ingredients and mix thoroughly. Combine Phase II ingredients and mix thoroughly. While mixing, add Phase I to Phase II.

Typical Properties:

Viscosity, cps: 75
 Solids: 13.8%
 pH: 10.2
 Formula 508

SOURCE: Witco Corp.: Suggested Formulations

Hard Surface Cleaner Concentrate
(Phosphate, Liquid)

Soil-Food grease, oil and protein, petroleum grease and oil
 Surface-Metal, ceramic, polymeric, glass
 Application Method-Wipe, mop or spray (diluted)
 Manufacture-Mix tank with propeller stirrer

<u>Composition A:</u>	<u>Wt%</u>
Water	71.4
TSP	1.6
Starso Sodium Silicate	14.0
Sodium Hydroxide (50%)	4.0
*Phosphate Ester	5.0
**Liquid Nonionic Surfactant (C9-C11; 6 Moles EO)	2.8
***Liquid Nonionic Surfactant (C9-C11; 2.5 Moles EO)	1.2

<u>Composition B:</u>	<u>Wt%</u>
Water	65.4
TSP	1.6
Starso Sodium Silicate	18.0
Sodium Hydroxide (50%)	5.0
*Phosphate Ester	6.0
**Liquid Nonionic Surfactant (C9-C11; 6 Moles EO)	2.8
***Liquid Nonionic Surfactant (C9-C11; 2.5 Moles EO)	1.2

Use Dilution: 3-6% bw (4-8 oz/gallon)

- * Rhone-Poulenc Rhodafac RE-600
- ** Rhone-Poulenc Rhodasurf 91-6
- *** Rhone-Poulenc Rhodasurf A-24

Hard Surface Spray Cleaner
(Phosphate, Liquid)

Soil-Food grease, oil and protein, petroleum grease and oil
 Surface-Metal, ceramic, polymeric, glass
 Application Method-Spray and wipe
 Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	90.00
TKPP	2.00
N Clear Sodium Silicate	1.88
Sodium Hydroxide (50%)	0.12
*Dipropylene Glycol Monomethyl Ether	5.00
**Octylphenoxy Polyethoxyethanol, 12-13 Moles EO	1.00

Use: As is, spray

- * Dow Chemical
- ** Rhone-Poulenc Igepal CA-720

SOURCE: PQ Corp.: Detergent Formulation Guide

Hard Surface Cleaner Concentrate w/Dipentene

<u>Ingredients:</u>	<u>Wt%</u>
Phase I:	
Isopropanol	10.0
Oleic Acid	8.8
Varonic K205	5.0
Dipentene	12.0
Phase II:	
Water, D.I.	62.2
Potassium Hydroxide (87%)	2.0

Blending Procedure:

Combine Phase I ingredients and mix thoroughly. Combine Phase II ingredients and mix thoroughly. While mixing, add Phase I to Phase II.

Typical Properties:

Viscosity, cps: 50
Solids: 13.8%
pH: 10.1
Formula 509

Alkaline Hard Surface Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	82.7
Sodium Metasilicate	3.0
Varamide A-83	5.0
Witconate 30DS	6.8
Witconate SXS Liquid	2.5

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 32
Solids: 11.0%
pH: 12.0
Formula 515

SOURCE: Witco Corp.: Suggested Formulations

Liquid Abrasive Cleanser

<u>Ingredients:</u>	<u>Wt%</u>
Water, tap	48.5
Calcium carbonate, 100 mesh	42.5
Sodium tallow soap, flakes	2.0
Alpha-Step MC-48	2.5
Ninol 11-CM	2.0
Sodium Chloride	2.5

Mixing Procedure:

Charge warm water and add calcium carbonate while mixing. Add soap and mix until dispersed. Add MC-48 and 11-CM and mix until homogeneous. Add sodium chloride to thicken.

Properties:

Appearance: Opaque, off-white creamy liquid
 pH, as is: 9.3
 Viscosity @ 25 deg C.: thixotropic
 spindle #3, 6 rpm, Brookfield: 4520 cps
 spindle #3, 12 rpm, Brookfield: 3840 cps
 spindle #3, 30 rpm, Brookfield: 3060 cps
 Solids, %: 50
 Density, lbs/gal: 11.69
 Storage at ambient temp, 1 week: No separation

Use Instructions: Use as is

Performance:

Cleans grease pencil, scuff marks and lipstick from vinyl tiles similar to commercial products.

SOURCE: Stepan Co.; Formulation No. 314

Tile and Sanitary Cleaners

<u>Ingredients:</u>	<u>Wt%</u>
Zusolat 1008/85	5.0
Water	79.6
Xanthan Gum	0.4
Citric acid	15.0

<u>Ingredients:</u>	<u>Wt%</u>
Amphotensid B 4	30.0
Water	60.0
Citric acid	10.0

SOURCE: Zschimmer & Schwarz GmbH & Co.; Suggested Formulations
 CT 02-10-03 and CT 02-10-04

Liquid Hard Surface Cleaner

<u>Ingredients:</u>	<u>Wt%*</u>
A: Van Gel ES, Magnesium Aluminum Silicate	4.00
Rhodopol 23, Xanthan Gum	0.50
Deionized Water	68.50
B: Cocamide DEA (Monamid 150-ADD)	0.50
Alkoxylated Fatty Alcohol (Plurafac C-17)	2.50
Tetrapotassium Pyrophosphate	1.25
Potassium Phosphate Tribasic	0.75
Deionized Water	21.00
C: Ammonium Hydroxide, 28%	1.00

Procedure:

1. Dry blend the Van Gel ES and Rhodopol 23 and slowly add them to the water while stirring with an homogenizer at 5000 rpm. Continue mixing for 40 minutes.
2. Combine the Part B ingredients with slow stirring.
3. Move the batch to a propeller mixer and adjust the speed to produce a slight vortex.
4. Add Part B to Part A, mix for 5 minutes and then add Part C and mix for 5 minutes.

Formulation No. 303

Hard Surface Cleaner-All Purpose

<u>Ingredients:</u>	<u>Wt.%*</u>
A: Veegum, Magnesium Aluminum Silicate	1.20
Rhodopol 23, Xanthan Gum	0.40
Deionized Water	48.40
B: Calcium Carbonate	40.00
C: C12-C13 Linear Primary Alcohol Ethoxylate (Neodol 23-6.5)	9.00
Cocamide DEA (Ninol 40-CO)	1.00
Preservative, Dye, Fragrance	q.s.

Procedure:

1. Dry blend the Veegum and Rhodopol 23 and slowly add the blend to the water while stirring with an homogenizer at 5000 rpm. Continue mixing for 20 minutes.
2. Add Part B and mix for 10 minutes.
3. Move the batch to a propeller mixer and adjust the speed to produce a slight vortex.
4. Add the Part C ingredients in the order shown, mixing for 5 minutes after each addition.

Formulation from Shell Chemical Co.

*As received basis

SOURCE: R.T. Vanderbilt Co., Inc.: Van Gel and Veegum in Hard Surface Cleaners and Polishes: Suggested Formulations

Mold and Mildew Remover

Carbopol resins are used to reduce splashing and to provide vertical cling when sprayed on a vertical surface. This "no-drip" action will increase the contact time of the detergent on the soiled surface and enhance consumer convenience.

<u>Ingredient:</u>	<u>Wt%</u>
DI water	84.50
Carbopol 672 (1)	1.00
Sodium hydroxide (50%)	2.00
Sodium metasilicate, pentahydrate	0.50
Primary alkane sulfonate (40%) (2)	5.00
Sodium hypochlorite (15.00%)	7.00

Brookfield viscosity (RVT-20 rpm): 120 cps

Product pH: 12-13

Product clarity: Opaque

(1) BFGoodrich

(2) Stepan Co.: Bio-Terge PAS-8S

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Under moderate agitation, add the sodium hydroxide and the metasilicate.
3. Add the alkane sulfonate.
4. Under low agitation, add the sodium hypochlorite bleach.
5. Add color and fragrance, as desired.

Total Actives:

Primary alkane sulfonate: 2.0

Available chlorine: 1.0

SOURCE: BFGoodrich Specialty Chemicals: DET-320

8. Laundry Products

Detergent for Fine Fabrics-1
Powder

<u>Ingredients:</u>	<u>Wt%</u>
Genapol OA-080	3.0
DDBS-Na*	15.0
Thermphos NW	25.0
Tallow soap, Powder	1.0-3.0
Sodium disilicate	3.0
Sokalan CP 5	1.0
Sokalan HP 22	1.0
Aquamollin BC Powder	0.5
Perfume	q.s.
Sodium sulphate	ad 100.0

Manufacturing:

To be prepared by spray mix process. Therefore DDBS-Na must be employed in form of a spray dried powder. DDBS-Na paste is not suitable.

*DDBS=Dodecyl Benzene Sulphonate

Detergent for Fine Fabrics-2
Powder

<u>Ingredients:</u>	<u>Wt%</u>
Genapol OA-080	3.0
DDBS-Na*	15.0
Zeolith A (Wessalith P)	20.0-25.0
Tallow soap, Powder	1.0- 3.0
Sodium disilicate	3.0
Sokalan CP 5	2.0- 3.0
Sokalan HP 22	1.0
Aquamollin BC Powder	0.5
Perfume	q.s.
Sodium sulphate	ad 100.0

Manufacturing:

To be prepared by spray mix process. Therefore DDBS-Na must be employed in form of a spray dried powder. DDBS-Na paste is not suitable.

*DDBS=Dodecyl Benzene Sulfonate

SOURCE: Hoechst Aktiengesellschaft: Suggested Formulations

Heavy Duty Laundry

<u>Ingredients:</u>	<u>Weight%</u>
Water	28.90
Sodium Hydroxide, 50%	6.60
Calamide C	7.00
Pilot SXS-40	12.50
Calsoft LAS-99	40.00
Caloxylate N-9	5.00
Comments about this formula:	
Add Caloxylate N-9 after 50% of LAS-99 has been neutralized.	
Formulation HDL-001-01	

Heavy Duty Laundry

<u>Ingredients:</u>	<u>Weight%</u>
Water	42.50
Pilot SXS-40	22.50
Calamide CWT	4.00
Sodium Silicate (Solid)	3.01
Calsoft L-60	18.00
EDTA (Ethylenediaminetetraacetic Acid)	2.50
Comments about this formula:	
Add ingredients in order listed.	
Formulation HDL-006-01	

Heavy Duty Laundry

<u>Ingredients:</u>	<u>Weight%</u>
Water	78.50
Calfax DB-45	7.00
Caloxylate N-9	7.00
Propylene Glycol	2.50
TKPP (Tetra Potassium Pyrophosphate)	5.00
Comments about this formula:	
Add ingredients in order listed.	
Formulation HDL-007-01	

Heavy Duty Laundry

<u>Ingredients:</u>	<u>Weight%</u>
Water	42.00
TKPP (Tetra Potassium Pyrophosphate)	15.00
Sodium Silicate (Solid)	10.00
Calsoft L-60	18.00
Pilot SXS-40	10.00
Calamide CWT	5.00
Comments about this formula:	
May need to be heated to solubilize the surfactant.	
Formulation HDL-008-01	

SOURCE: Pilot Chemical Co.: Suggested Formulations

**I & I Liquid Laundry Detergent
with Enzyme & Optical**

<u>Components:</u>	<u>% by Weight</u>
Water	50.00
Triethanolamine 85%	3.25
Diethylene Glycol	20.00
Burcol 117	10.00
Burcol LAF-6	10.00
Burcowite BBH-20	1.25
Burcotase SL-160	0.50

Burco LAF-6 is used to control foam as well as to provide wetting and detergency.

Procedure:

Charge 1/2 of water @ 120F. Add 1,2,3, & 4 and blend. Add remaining water. Cool to 100F. Add 5 and 6. Blend until uniform.

1% pH: 9.5
% solids: 26
Lbs/gal: 8.66

Surfactant Rich Detergent for Nursing Homes

<u>Ingredients:</u>	<u>% by Weight</u>
Water	30
TKPP	5
Sodium Metasilicate Pentahydrate	5
Burcoterge DG-40	40
Burco NPS-816	10
SXS-40%	10

6-8 ounces per 100 pounds of laundry. Heavy soils may require slightly higher levels.

SOURCE: Burlington Chemical Co.: Suggested Formulations

Powder for Automatic Dishwashing Machines

<u>Ingredients:</u>	<u>% by Weight</u>
A Genapol 2908	1.00
B Sodium metasilicate x 5H ₂ O	52.00
C Sodium carbonate	10.00
Sodium dichloroisocyanurate	2.00
Thermphos NW	35.00

Manufacturing:

I Spray A on B.

II One after another, the components of C are added to I.

Application: 1-2g detergent/L dishwashing liquor

SOURCE: Hoechst Aktiengesellschaft: Suggested Formulation

Industrial Heavy Duty Laundry Liquid

Carbopol ETD 2691 is to provide product phase stabilization in this high alkalinity industrial strength cleaner.

<u>Ingredient:</u>	<u>Wt%</u>
DI water	49.00
Carbopol ETD 2691 (1)	0.50
C12-15 linear alcohol, 7 moles EO (2)	18.00
Sodium alkylbenzene sulfonate (60%) (3)	5.50
Potassium hydroxide (45%)	2.00
Sodium metasilicate, anhydrous	5.00
Tetrapotassium pyrophosphate	20.00

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 900
 Product pH: 14
 Product Clarity: Opaque

Raw Material Suppliers:

- (1) BFGoodrich
- (2) Shell Chemical Co.: Neodol 25-7
- (3) Stepan Co.: Biosoft D-62

Procedure:

1. Use a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations. Screen the Carbopol resin into the vortex of the rapidly agitating water (800 rpm). Allow to mix until homogeneous and free of polymer lumps.
2. With slow mixing, add in the alcohol ethoxylate and alkylbenzene sulfonate surfactants.
3. Continue agitating and add the potassium hydroxide and metasilicate.
4. Add in the pyrophosphate with minimal agitation to avoid air entrapment.
5. Add dyes and fragrance, as desired.

Total Actives:

Sodium alkylbenzene sulfonate: 3.30
 C12-15 linear alcohol, 7 moles EO: 18.00
 Tetrapotassium pyrophosphate: 20.00

SOURCE: BFGoodrich Specialty Chemicals: DET-201

Industrial Laundry Detergents
High Caustic Formulation

<u>Components:</u>	<u>% by Weight</u>
Burco NPS-816	15.0
Burcosperse LP	10.0
Burcolite BSGH-255	5.0
Dequest 2000	5.0
50% NaOH	65.0

Procedure:

Blend all components except 50% NaOH. Slowly add NaOH with agitation. Keep temperature below 160F during the entire agitation.

Mixed Builder Formulation

<u>Components:</u>	<u>% by Weight</u>
Water	31.5
45% KOH	23.5
Burcosperse LP	10.0
TKPP	10.0
Burco NPS-816	15.0
Star Grade Sodium Silicate	10.0

Procedure:

Dissolve KOH in water. Slowly add Burcosperse LP while agitating. Keep temperature below 160F. Add TKPP and stir until dissolved. Add Burco NPS-816, then Star Grade Sodium Silicate and blend until uniform.

Use levels are 6-12 ounces per 100 pounds, depending on soil loading, temperature, etc.

SOURCE: Burlington Chemical Co., Inc.: Suggested Formulations

Washing Paste with Bleaching Agent

<u>Ingredients:</u>	<u>% by Weight</u>
Water	39.0
Sodium tripolyphosphate	3.0
Sodium dithionit	12.0
Xanthan Gum	2.0
White-spirit	10.0
Lumorol 4154	30.0
Zusolat 1005/85	5.0

SOURCE: Zschimmer & Schwarz GmbH & Co.: Formulation CT 01-06-01

Laundry Detergent-Consumer
(Liquid)

Soil-Body oil and perspiration, body waste, make-up, food soil
Surface-Cotton and cotton/polyester
Application Method-Household washing machine
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	37.6
Fluorescent Brightener	0.2
Carboxymethylcellulose (CMC)	0.5
*Acrysol ASE-108	6.0
**Nonylphenoxy Polyethoxyethanol, 9-10 Moles EO	10.0
Potassium Hydroxide (45%)	2.2
***Sodium Citrate (and/or Citric Acid)	25.0
Kasil #6 Potassium Silicate	12.5
EDTA	5.0
Enzymes (Protease)	1.0

- * Rohm & Haas; or Rhone-Poulenc Colloid 225/35 Polyacrylate (40%)
- ** Rhone-Poulenc Igepal CO-630
- *** Adjust pH with citric acid to maintain pH for effective enzyme performance (i.e. 8.5-9.5 pH).

Laundry Detergent-Consumer
(Zeolite Built, Zero Phosphate, Liquid)

Soil-Body oil and perspiration, body waste, food soil, make-up
Surface-Cotton and cotton-polyester
Application Method-Household washing machine
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	52.6
Carbopol 674	0.5
D Liquid Sodium Silicate	8.1
*Acusol 445ND Sodium Polyacrylate (92% solids)	0.9
Sodium Carbonate	9.1
Valfor 100 Zeolite A	24.5
**Liquid Nonionic Surfactant (C12-13, EO 6.5 Moles)	4.3

- * Rohm & Haas
- ** Shell Chemical Neodol 23-6.5

SOURCE: PQ Corp.: Detergent Formulary Guide

Laundry Detergent-Consumer
(Zero Phosphate, Powder)

Soil-Acidic food fat, oil grease, blood, sebum and body waste
 Surface-Cotton and cotton-polyester
 Application Method-Household Washing Machine
 Manufacture-Dry Blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Carbonate	30.0
Britesil H2O Hydrous Polysilicate	10.0
*Acusol 445ND Sodium Polyacrylate (92% solids)	2.0
**Linear Alkylbenzene Sulfonate (LAS)	10.0
***Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	5.0
Valfor 100 Zeolite A	30.0
Sodium Sulfate	12.5
Optical Brightener, Perfume	0.5

Use Level: 1000 ppm detergent delivered to wash (1 gram
 detergent/liter of water)

- * Rohm & Haas
- ** Stepan Nacconol 90G (90% active; powder)
- *** Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical
 Neodol 25-7

Laundry Detergent-Consumer
(Phosphate, Powder)

Soil-Acidic food fat and protein, body perspiration, grass and
 dirt
 Surface-Polyester, cotton/polyester, cotton
 Application Method-Household washing machine
 Manufacture-Dry blend/agglomeration

<u>Composition:</u>	<u>Wt%</u>
Britesil H2O Hydrous Polysilicate	10.0
*STPP	30.0
*Sodium Carbonate	30.0
Sodium Sulfate	14.5
**Linear Alkylbenzene Sulfonate (LAS)	10.0
***Liquid Nonionic Surfactant (7-9 Moles EO; C12-15)	5.0
Optical Brightener, Perfume	0.5

Use Level: 1000 ppm detergent delivered to wash (1 gram/liter of
 water)

- * FMC
- ** Stepan Nacconol 90G (90% active; powder)
- *** Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Co.
 Neodol 25-7

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Break-Industrial & Institutional
(Liquid, Phosphate)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste

Surface-Cotton and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Mix tank with propeller stirrer

<u>Composition A:</u>	<u>Wt%</u>
Water	34.1
TKPP	10.0
Potassium Hydroxide (45%)	30.4
Star Sodium Silicate	18.0
Sodium Hydroxide (50%)	7.5

<u>Composition B:</u>	<u>Wt%</u>
Water	25.6
TKPP	10.0
Potassium Hydroxide (45%)	30.4
Star Sodium Silicate	24.0
Sodium Hydroxide (50%)	10.0

Use Dilution: Light Soil: 0.25% by weight or 1 lb per 100 lbs laundry

Medium to Heavy Soil: 0.25%-0.50% by weight or 1-2 lbs per 100 lbs laundry

Note: Use builder solution in conjunction with laundry detergent (unbuilt) at 2-4 parts of builder to 1 part detergent.

Laundry Break-Industrial & Institutional
(Liquid)

Soil-Petroleum oil and grease, graphite and colored pigment

Surface-Polyester and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	0-20
N Clear Sodium Silicate	70-90
Sodium Hydroxide (50%)	10-20

Use Dilution: Light Soil: 0.25% by weight or 1 lb per 100 lbs laundry

Medium/Heavy Soil: 0.25%-0.50% by weight or 1-2 lbs per 100 lbs laundry

Notes: Blend this builder solution to 1.7-2.0 ratio SiO₂/Na₂O bw for best stability and industrial detergency.

D or BJ-120 sodium silicates can also be used as builder solutions without blending.

Use builder solution in conjunction with laundry detergent (unbuilt) at 2-4 parts bw of builder to 1 part detergent.

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Detergent-Industrial & Institutional
(NTA/Zeolite, Powder)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste
 Surface-Cotton and cotton/polyester
 Application Method-Industrial washing machine
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	25.0
Sodium Carbonate	38.0
NTA	15.0
*Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	12.0
Valfor 100 Zeolite A	10.0

Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry
 Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry
 Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry

Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying power is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.

* Rhone-Poulenc Rhodasurf LA-7 or LA-9 or
 Shell Chemical Neodol 25-7

Laundry Break-Industrial & Institutional
(Zero Phosphate, Powder)

Soil-Petroleum oil and grease, graphite and colored pigment
 Surface-Polyester and cotton/polyester
 Application Method-Industrial washing machine
 Manufacture-Use as received

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	100.0

Use Dilution: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry
 Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry
 Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry

Note: Use in conjunction with laundry detergent (unbuilt) at 2-4 parts bw of builder with 1 part detergent.

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Detergent-Industrial & Institutional
(Phosphate, Powder)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste

Surface-Cotton and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	25.0
*Sodium Carbonate	35.0
*STPP	30.0
**Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	10.0
Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry	
Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry	
Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry	

Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying power is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.

* FMC

** Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7

Laundry Detergent-Industrial & Institutional
(Sodium Carbonate, Powder)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste

Surface-Cotton and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	25.0
Sodium Carbonate	55.0
Sodium Sulfate	10.0
*Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	10.0
Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry	
Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry	
Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry	

Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying power is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.

* Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Break-Industrial & Institutional
(Phosphate, Powder, High Alkalinity)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste

Surface-Cotton and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Dry blend/Agglomeration

<u>Composition A:</u>	<u>Wt%</u>
Metso Beads 2048	60.0
Sodium Hydroxide Beads	40.0

<u>Composition B:</u>	<u>Wt%</u>
Metso Beads 2048	30.0
*STPP	20.0
*Sodium Carbonate	28.0
Carboxymethylcellulose	2.0
Sodium Hydroxide Beads	20.0

Use Dilution: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry

Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry

Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry

Note: Use these alkali builders in conjunction with laundry detergent (unbuilt) at 2-4 parts bw of builder with 1 part detergent

* FMC

Laundry Break-Industrial & Institutional
(Zero Phosphate Powder, High Alkalinity)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste

Surface-Cotton and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Dry blend/Agglomeration

<u>Composition A:</u>	<u>Wt%</u>
Metso Beads 2048	60.0
Sodium Hydroxide Beads	40.0

<u>Composition B:</u>	<u>Wt%</u>
Metso Beads 2048	30.0
Sodium Carbonate	28.0
Carboxymethylcellulose	2.0
Sodium Hydroxide Beads	20.0
Valfor 100 Zeolite A	20.0

Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry

Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry

Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry

Note: Use these alkali builders in conjunction with laundry detergent (unbuilt) at 2-4 parts bw of builder with 1 part detergent

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Detergent-Industrial & Institutional
(Reduced Phosphate, Powder)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste

Surface-Cotton and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	25.0
*Sodium Carbonate	35.0
*STPP	20.0
**Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	10.0
Valfor 100 Zeolite A	10.0
Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry	
Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry	
Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry	
Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying power is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.	
* FMC	
** Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7	

Laundry Detergent-Industrial & Institutional
(NTA, Powder)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste

Surface-Cotton and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	25.0
Sodium Carbonate	40.0
NTA	25.0
*Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	10.0
Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry	
Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry	
Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry	
Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying power is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.	
*Rhone-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7	

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Detergent-Industrial & Institutional
(Sodium Carbonate with Flow Aid, Powder)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste
 Surface-Cotton and cotton/polyester
 Application Method-Industrial washing machine
 Manufacture-Dry blend/agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	20.0
Sodium Carbonate	55.0
Sodium Sulfate	10.0
*Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	10.0
Valfor 100 Zeolite A	5.0

Use Level: Light Soil: 0.25% by weight or 1 lb per 100 lbs laundry
 Medium Soil: 0.50% by weight or 2 lbs per 100 lbs laundry
 Heavy Soil: 0.75% by weight or 3 lbs per 100 lbs laundry

Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying power is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.

* Rhone-Poulenc Rhodasurf LA-7 or LA-9 or
 Shell Chemical Neodol 25-7

Laundry Detergent-Industrial & Institutional
(Phosphate, Solid Block)

Soil-Acidic food fat, oil and grease; blood, sebum and body waste
 Surface-Cotton and cotton/polyester
 Application Method-Industrial washing machine
 Manufacture-Solid block

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	25.0
NaOH (50% Solution)	25.0
*STPP	35.0
*Sodium Carbonate	12.0
**Liquid Nonionic Surfactant (7-9 Moles EO; C12-15)	3.0

* FMC
 ** Rhone-Poulenc Rhodasurf LA-7 or LA-9 or
 Shell Chemical Neodol 25-7

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Detergent-Industrial and Institutional
(Zero Phosphate, Powder)

Soil-Acidic food fat, oil grease, blood, sebum and body waste
 Surface-Cotton and cotton polyester
 Application Method-Industrial washing machine
 Manufacture-Dry Blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Carbonate	35.0
*Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	15.0
Valfor 100 Zeolite A	25.0
Metso Beads 2048	25.0
Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry	
Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry	
Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry	
Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying powder is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.	
*Rhône-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7	

Laundry Detergent-Industrial and Institutional
(Zero Phosphate, Powder)

Soil-Petroleum oil and grease, graphite and colored pigment
 Surface-Polyester and cotton/polyester
 Application Method-Industrial washing machine
 Manufacture-Dry Blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Carbonate	44.5
*Liquid Nonionic Surfactant (7-9 moles EO; C12-15)	18.0
Valfor 100 Zeolite A	30.0
**Acusol 445ND Sodium Polyacrylate (92% solids)	2.5
Metso Beads 2048	5.0
Use Level: Light Soil-0.25% by weight or 1 lb per 100 lbs laundry	
Medium Soil-0.50% by weight or 2 lbs per 100 lbs laundry	
Heavy Soil-0.75% by weight or 3 lbs per 100 lbs laundry	
Note: Use Britesil H20 in place of Metso Beads 2048, partially or fully, if lower alkalinity is desired and more suspending/emulsifying power is needed. Britesil H20 will also increase the surfactant adsorbency of detergent blend.	
* Rhône-Poulenc Rhodasurf LA-7 or LA-9 or Shell Chemical Neodol 25-7	
** Rohm & Haas	

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Detergent-Industrial & Institutional
(Phosphate Built, Liquid)

Soil-Body oil and perspiration, body waste, make-up, food soil
 Surface-Cotton and cotton/polyester
 Application Method-Industrial washing machine
 Manufacture-Mix tank with propeller stirrer

<u>Composition A:</u>	<u>Wt%</u>
Water	54.5
TKPP	4.6
Potassium Hydroxide (45%)	13.7
Starso Sodium Silicate	15.0
Sodium Hydroxide (50%)	4.2
*Phosphate Ester	5.0
**Liquid Nonionic Surfactant (C12-C15, 7-9 Moles EO)	3.0

<u>Composition B:</u>	<u>Wt%</u>
Water	59.1
Potassium Hydroxide (45%)	13.7
Starso Sodium Silicate	15.0
Sodium Hydroxide (50%)	4.2
*Phosphate Ester	5.0
**Liquid Nonionic Surfactant (C12-C15, 9 Moles EO)	3.0
Use Dilution: 0.25%-0.50% by weight or 1-2 lbs per 100 lbs laundry	
* Rhone-Poulenc Rhodafac RE-610	
** Rhone-Poulenc Rhodasurf LA-7 or LA-9	

Laundry Detergent-Industrial & Institutional
(Liquid)

Soil-Body oil and perspiration, body waste, make-up, food soil
 Surface-Cotton and cotton/polyester
 Application Method-Industrial washing machine
 Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	28.7
Fluorescent Brightener	0.1
Carboxymethylcellulose (CMC)	0.5
*Acrysol ASE-108 (Acrylic Polymer)	6.0
**Nonylphenoxy Polyethoxyethanol, 9-10 Moles EO	10.0
Potassium Hydroxide (45%)	2.2
TKPP (60%)	40.0
Kasil #6 Potassium Silicate	12.5
Use Dilution: 0.25%-0.50% by weight or 1-2 lbs per 100 lbs laundry	
* Rohm & Haas; or Rhone-Poulenc Colloid 226/35 Polyacrylate (40%)	
**Rhone-Poulenc Igepal CO-630	

SOURCE: PQ Corp.: Detergent Formulary Guide

Laundry Builder-Industrial & Institutional
(Liquid)

Soil-Acidic food, fat, oil and grease; blood, sebum and body waste

Surface-Polyester and cotton/polyester

Application Method-Industrial washing machine

Manufacture-Mix tank with propeller stirrer

<u>Composition A:</u>	<u>Wt%</u>
Potassium Hydroxide (45%)	35-45
N Clear or E Sodium Silicate	55-65

<u>Composition B:</u>	<u>Wt%</u>
Water	11.0
Potassium Hydroxide (Solid)	37.0
N Clear or E Sodium Silicate	52.0

<u>Composition C:</u>	<u>Wt%</u>
Water	6.0
Potassium Hydroxide (Solid)	28.0
N Clear or E Sodium Silicate	52.0
Sodium Hydroxide (Solid)	14.0

Use Dilution: Light Soil: 0.25% by weight or 1 lb per 100 lbs laundry

Medium to Heavy Soil: 0.25%-0.50% by weight or 1-2 lbs per 100 lbs laundry

Note: Use builder solution in conjunction with laundry detergent (unbuilt) at 2-4 parts bw of builder to 1 part detergent

Laundry Detergent-Industrial & Institutional
(Zeolite Built, Zero Phosphate, Liquid)

Soil-Body oil and perspiration, body waste, food soil, make-up

Surface-Cotton and cotton-polyester

Application Method-Industrial washing machine

Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	57.06
Carbopol 674	0.5
Metso Beads 2048	2.7
*Acusol 445N Sodium Polyacrylate (45% solids)	1.84
Sodium Carbonate	9.1
Valfor 100 Zeolite A	24.5
**Liquid Nonionic Surfactant (C12-13; EO 6.5 Moles)	4.3

* Rohm & Haas

** Shell Chemical Neodol 23-6.5

SOURCE: PQ Corp.: Detergent Formulation Guide

Laundry Prespotter Sprayable Gel

Carbopol ETD 2623 is used in this formulation to cost effectively thicken the surfactant system into a gel form - which can be applied to the fabric by brush or sprayed on due to Carbopol's shear thinning nature.

<u>Ingredient:</u>	<u>Wt%</u>
DI water	83.75
Carbopol ETD 2623 (1)	0.20
C12-15 linear alcohol, 3 moles EO (2)	10.00
C12-13 linear alcohol, 6.5 moles EO (3)	5.00
EDTA (tetra sodium salt)	0.50
Sodium hydroxide (18%)	0.55

Brookfield viscosity (RVT-20 rpm): 8,300 cps

Product pH: 7.0-8.0

Product clarity: Opaque

- (1) BFGoodrich
- (2) Shell Chemical Co.: Neodol 25-3
- (3) Shell Chemical Co.: Neodol 23-6.5

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add in both of the alcohol ethoxylate surfactants. Mix until homogeneous.
3. Add in the EDTA.
4. Add in the sodium hydroxide until the pH is attained.
5. Add color and fragrance, as desired.

Total Actives:

C12-15 linear alcohol, 3 moles EO (2): 10.0

C12-13 linear alcohol, 6.5 moles EO (3): 5.0

SOURCE: BFGoodrich Specialty Chemicals: DET-221

Laundry Prespotter Sprayable Liquid

Carbopol ETD 2623 is used in this formulation to slightly thicken the surfactant system and enable the product to stay in contact with the soil longer by reducing seepage through the fabric.

<u>Ingredient:</u>	<u>Wt%</u>
DI water	84.30
Carbopol ETD 2623 (1)	0.05
C12-15 linear alcohol, 3 moles EO (2)	10.00
C12-13 linear alcohol, 6.5 moles EO (3)	5.00
EDTA (tetra sodium salt)	0.50
Sodium hydroxide (18%)	0.15

Brookfield viscosity (RVT-20 rpm): 250 cps

Product pH: 7.0-8.0

Product clarity: Opaque

- (1) BFGoodrich
- (2) Shell Chemical Co.: Neodol 25-3
- (3) Shell Chemical Co.: Neodol 23-6.5

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add in both of the alcohol ethoxylate surfactants. Mix until homogeneous.
3. Add in the EDTA.
4. Add in the sodium hydroxide until the pH is attained.
5. Add color solution and fragrance, as desired.

Total Actives:

C12-15 linear alcohol, 3 moles EO: 10.0
C12-13 linear alcohol, 6.5 moles EO: 5.0

SOURCE: BFGoodrich Specialty Chemicals; DET-220

Light Duty Liquid Detergent

Ingredients:	Weight%
Water	48.45
Pilot SXS-40	7.50
Calsoft L-60	30.00
Calamide C	5.00
Calfoam EA-603	8.30
Calsoft LAS-99	0.60
Citric Acid	0.10
Sodium Citrate	0.05

Comments about this formula:

1. pH=7.1
 2. Add Citric Acid if pH is high or Sodium Citrate if pH is low.
 3. Viscosity should be 300 cPs.
- Formulation LDL-001-01

Light Duty Liquid Detergent

Ingredients:	Weight%
Water	22.31
Calsoft L-60	39.70
Pilot SXS-40	22.10
Calamide C	7.06
Calfoam EA-603	7.35
Calsoft LAS-99	0.56
Opacifier	0.88
Sodium Citrate	0.04

Comments about this formula:

1. Add either Citric Acid or Calsoft LAS-99 to adjust pH to 7.0-7.2.
 2. Solids 45%.
 3. Substituting Calsoft L-40 for Calsoft L-60 will lower product solids to 42%.
- Formulation LDL-002-01

Light Duty Liquid Detergent

Ingredients:	Weight%
Water	18.80
Calsuds A	70.00
Calfoam ES-303	10.00
Perfume	0.10
Kathon CG	0.10
Opacifier	1.00

Comments about this formula:

1. If opacifier is to be added, withhold 5% of the water.
 2. Add the opacifier to the water prior to adding to the detergent.
- Formulation LDL-004-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

Light Duty Liquid Detergent

Ingredients:	Weight%
Water	50.20
Calsuds CD-6	25.00
Pilot SXS-40	8.80
Calfoam EA-603	10.00
Calsoft LAS-99	6.00

Comments about this formula:

1. Ingredients should be added in the order listed to aid in blending.
2. Sodium Citrate/Citric Acid should be added for pH adjustment to 7+.
3. Salt (Sodium or Ammonium Chloride) will raise the viscosity. Formulation LDL-006-01

Light Duty Liquid Detergent

Ingredients:	Weight%
Water	36.90
Pilot SXS-40	5.00
Calsoft T-60	40.00
Calfoam ES-303	15.00
Calamide C	2.00
Preservative	0.10
Sodium Chloride	1.00

Comments about this formula:

Viscosity 275 cPS.
 Solids=32-33%
 pH=6.2
 Formulation LDL-007-01

Light Duty Liquid Detergent

Ingredients:	Weight%
Water	65.18
Pilot SXS-40	6.29
Linear Alcohol Ethoxylate	2.52
NaOH, 50%	2.81
Diethanolamine	3.43
Calsoft LAS-99	19.77

Comments about this formula:

Solids=30%
 Good for greasy applications.
 Formulation LDL-008-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

Light Duty Liquid Detergent

<u>Ingredients:</u>	<u>Weight%</u>
Water	13.90
Ammonium Chloride	2.40
Pilot SXS-40	19.60
Calsoft L-60	44.10
Calfoam ES-303	15.80
Calamide C	4.00
Citric Acid	0.10
Preservative	0.10

Comments about this formula:

1. "As is" pH=8.0.
2. Add Citric Acid in place of Sodium Citrate to lower pH.
Formulation LDL-009-01

Light Duty Liquid Detergent
Calsoft LAS-99 Based

<u>Ingredients:</u>	<u>Weight%</u>
Water	43.60
NaOH, 50%	5.80
Calsoft LAS-99	21.70
Pilot SXS-40	16.70
Calfoam ES-303	3.00
Caloxylate N-9	8.00
Citric Acid	0.10
Opacifier	1.00
Preservative	0.10

Comments about this formula:

- Add ingredients in order listed.
Formulation LDL-011-01

Light Duty Liquid Detergent
Calsoft LAS-99 Based

<u>Ingredients:</u>	<u>Weight%</u>
Water	52.40
NaOH, 50%	4.40
Calsoft LAS-99	16.30
Calamide C	5.00
Pilot SXS-40	12.50
Calfoam ES-303	2.20
Caloxylate N-9	6.00
Citric Acid	0.10
Opacifier	1.00

Comments about this formula:

- Add ingredients in order listed.
Formulation LDL-012-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

Light Duty Liquid Detergent
Calsoft LAS-99 Based

<u>Ingredients:</u>	<u>Weight%</u>
Water	54.60
Calsoft LAS-99	16.30
NaOH, 50%	4.35
Alcohol Ethoxylate	10.00
Calamide C	2.05
Pilot SXS-40	12.50
Perfume	0.10
Preservative	0.10

Comments about this formula:

Add ingredients in order listed.
 Formulation LDL-014-01

Light Duty Liquid Detergent
Dry Cleaner: Pre Spot-Water Soluble

<u>Ingredients:</u>	<u>Weight%</u>
Water	75.70
Calamide C	2.00
Caloxylate N-9	11.00
Calimulse PRS	11.00
Citric Acid	0.20
Perfume & Color	0.10

Comments about this formula:

1. Add ingredients in order listed. Viscosity increases as Caloxylate N-9 is added.
 2. A clear product is obtained when all ingredients are mixed together.
 3. Detergent fragrance R-1264 can be used in this formula.
 4. Use level: dilute 8:1 with water.
- Formulation LDY-001-01

Light Duty Liquid Detergent
Wool Wash

<u>Ingredients:</u>	<u>Weight%</u>
Calsoft T-60	14.15
Calamide CW-100	5.48
Calfoam ES-303	39.64
Citric Acid	0.13

Comments about this formula:

The room temperature viscosity is about 520 cPs.
 Formulation LDY-002-01

Light Duty Liquid Detergent
Wool Wash

<u>Ingredients:</u>	<u>Weight%</u>
Calsuds A	50.06
Water	49.93

Comments about this formula:

The room temperature viscosity is about 25 cPs.
 Formulation LDY-004-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

Two Part Industrial Laundry Detergents

Break Formulations

Highly Alkaline Break

<u>Components:</u>	<u>% by Weight</u>
Water	5
Burcosperse LP	10
Burcolite BSGH-255	5
Dequest 2000	5
50% NaOH	75

Mixed Builder Break

<u>Components:</u>	<u>% by Weight</u>
Water	40.0
45% KOH	27.5
Burcosperse LP	10.0
TKPP	10.0
Sodium Silicate (Star Grade)	12.5

Procedure:

Add components in the order listed. Blend until homogeneous between each addition. Keep temperature below 160F during blending.

Detergent Additive

<u>Components:</u>	<u>% by Weight</u>
Water	60.00
Burco NPS-816	10.00
Neodol 25-7	12.50
Dodecylbenzenesulfonic Acid	11.65
TEA-85	5.85

Procedure:

Add components in the order listed. Blend until homogeneous between each addition.

Use Level:

Break: 4-12 ounces/100 pounds

Detergent: 2-4 ounces/100 pounds

SOURCE: Burlington Chemical Co., Inc.: Suggested Formulations

Ultra Liquid Laundry Detergent

<u>Ingredients:</u>	<u>Wt%</u>
Alpha-Step MC-48	29.0
Sodium Oleate	5.0
Alcohol, Ethoxylate, 7	19.0
Borax	1.3
3A Alcohol	0.5
Propylene Glycol	5.0
PVP K-15	0.8
Water, fragrance & dye	Q.S. to 100.0

Mixing Procedure:

Combine Alpha-Step MC-48, propylene glycol, alcohol ethoxylate and water while mixing until solution is homogeneous. Heat to approximately 50 deg. C, add sodium oleate and mix until solution and is again homogeneous. Allow mixture to cool to room temperature and add the remaining ingredients with mixing. Adjust pH with caustic soda or citric acid if necessary.

Typical Formulation Properties:

Formulation Description: SME/Soap Based HDL

pH: 8-10

Viscosity: 200-350 cps

Density: 8.6

Appearance: Clear, light yellow liquid

Use Instructions: Use 1/3 cup per normal size washload

Comment:

Alpha-Step MC-48 is an excellent soap solubilizer that can make high soap levels possible in finished products.

Formulation No. 658

Fine Fabric Wash

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	43.4
Alpha-Step MC-48	46.0
Ninol 30-LL	4.6
Sodium chloride	6.0

Mixing Procedure:

Charge water and MC-48 and mix. Add 30-LL and mix until homogeneous. Add sodium chloride to thicken. Adjust pH with sulfuric acid or sodium hydroxide as necessary.

Properties:

Appearance: Clear yellow liquid

pH, as is: 7.5

Viscosity @ 25 deg. C, cps: 220

Solids, %: 29.0

Freeze/thaw, 3 cycles: pass

Cold storage @ 4 deg. C, 1 week: pass

High temp. storage @ 50 deg. C, 1 week: pass

Density, lbs/gal: 8.6

Use Instructions:

Use small amount for hand washing or 1/4 cup for machine washing.

Comment:

The surfactants used in this formulation are derived from oleochemical resources and are biodegradable.

Formulation No. 358

SOURCE: Stepan Co.: Suggested Formulations

9. Metal Cleaners and Polishes

Acid Metal Cleaner*

The combination of Veegum and Rhodopol 23 suspends the abrasive and provides a stable, free flowing cleaner with good vertical surface cling. Veegum is protected against flocculation in this pH 1 composition through base exchange with the imidazoline. Tetrasodium EDTA facilitates this exchange. Veegum and Rhodopol provide synergistic thickening with better viscosity stability and inhibition of syneresis than is possible with either thickener alone. Diatomaceous Earth provides good cleaning and polishing.

<u>Ingredients:</u>	<u>Wt%</u>
A: Veegum	0.8
Rhodopol 23	0.4
Water	72.1
B: Tetrasodium EDTA	0.9
1-Hydroxyethyl-2-caprylimidazoline	0.8
Phosphoric acid	15.0
Diatomaceous Earth	10.0

Procedure:

Blend Veegum and Rhodopol. Slowly add them to the water while agitating at maximum available shear. Continue mixing until smooth. Add B ingredients in order, mixing well after each addition until smooth and uniform (avoid incorporation of air).

Consistency: White, pourable liquid.

Suggested Packaging: Plastic squeeze bottle with precautionary labeling for acid.

*U.S. Patent No. 4,302,253

SOURCE: R.T. Vanderbilt Co., Inc.: Formulation No. 392

Dipping Cleaner for Silver

<u>Ingredients:</u>	<u>Wt%</u>
Zusolat 1008/85	2.5
Thiourea	8.0
Hydrochloric acid	3.0
Water	86.5

SOURCE: Zschimmer & Schwarz GmbH & Co.: Formulation CT 02-15-02

Aluminum Cleaner/Brightener

Traditionally, anionic surfactants have offered better detergency than nonionics, but were not compatible in acid systems. This formulation uses Avanel S-70, an anionic molecule which performs even at very low pH's and aids in the removal of surface oils and deposits. Unlike nonionics, Avanel S-70 will dissolve readily into the formulation without forming gel particles thus eliminating the need for excessive agitation. This formulation can be used for over-the-road aluminum trailers, wire wheels on automobiles or in the preparation of aluminum for anodizing and cleaning.

<u>Ingredients:</u>	<u>Wt%</u>
Deionized Water	83.0
Phosphoric Acid (85%)	6.0
Citric Acid (50%)	8.0
Nitric Acid (70%)	1.0
Avanel S-70	2.0

Procedure:

Charge the water to a mixing vessel. Under slow agitation and with due care, add the acids to the water. Add the Avanel S-70 and mix 10 minutes. NOTE: If additional brightening is required, the nitric acid concentration may be increased to 1.5%.

Formulation CM-101

Powdered Metal Cleaning Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Hydroxide	58.5
Sodium Carbonate	13.5
STPP	20.0
Avanel S-70	8.0

Procedure:

Add ingredients as listed.

Aluminum Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Deionized Water	85.0
Avanel S-70	6.0
Tetrapotassium Pyrophosphate	5.0
Sodium Metasilicate Pentahydrate	1.0
Carbitol Solvent	3.0

Procedure:

Charge vessel with ingredients in the order listed using moderate agitation. NOTE: Other Avanel products could be used in this formulation to achieve different surfactant characteristics.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Aluminum Cleaner Concentrate F-498

	<u>% By Weight</u>
Water	75
Sodium Metasilicate (Anhydrous)	10
Tetra Potassium Pyrophosphate (Powder)	5
Mona NF-10	10

Procedure:

Dissolve sodium metasilicate and tetra potassium pyrophosphate in water with mixing, then add Mona NF-10.

Typical Properties:

Appearance: Clear liquid

Cloud Point: 88C

Recommended Use Dilution: 1 to 4 oz/gal.

Aluminum Wash F-499

	<u>% By Weight</u>
Water	88
Sodium Metasilicate (Anhydrous)	2
Tetra Sodium Pyrophosphate (Powder)	3
Butyl Carbitol	2
Mona NF-10	5

Procedure:

Dissolve sodium metasilicate and tetra sodium pyrophosphate in water, then add Butyl Carbitol and Mona NF-10.

Typical Properties:

Appearance: Clear liquid

pH: 12.8

Recommended Use Dilution: 1:10 with water

SOURCE: Mona Industries, Inc.: Suggested Formulations

Buffing Compound Remover

<u>Component:</u>	<u>Wt%</u>
Water	42.5
TEA	20.0
Burcotrope 1250	12.5
Burcosperse LP	12.5
Borax	5.0
Burco TME	5.0
Burco LAF-6	5.0

Add components in order listed. Blend until homogeneous between each addition.

Hot Alkaline Paint Stripper Concentrate

<u>Components:</u>	<u>Wt%</u>
45% KOH	67
Kasil #1	32
Burco HCS-50 NF	1

Add components in the order listed. Blend until homogeneous between each addition.

SOURCE: Burlington Chemical Co., Inc.: Suggested Formulations

Metal De-Oiling Liquid Concentrate (Liquid)

Soil - Petroleum-based oil
Surface - Metal: Steel, copper, aluminum, etc.
Application Method - Spray and/or immersion
Manufacture - Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	42.0
Starso	12.0
EDTA, Tetrasodium (37%)	16.0
Sodium Xylene Sulfonate (40%)	20.0
C9-C11 Linear Alcohol, 6 Moles EO	3.0
C9-C11 Linear Alcohol, 2.5 Moles EO	7.0

Use Dilution: 2%-4% bv

SOURCE: The PQ Corp.: Suggested Formulation

Cutting Oil

Monalube 215 provides excellent lubricity, and extreme pressure properties. This formulation is used in machining, stamping and drawing ferrous and nonferrous metals.

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	95.0
Monalube 215	5.0

Procedure:

Combine ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Amber Liquid

Viscosity/40C: 24 cS

Performance Data:

Falex (Direct Scale): 2000 Lbs./56 In.-Lbs.

Draw Bead Efficiency: 95

Draw Bead Efficiency Reference Oil: 115

Formulation F-791

Cutting Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	90.0
Monalube 205	5.0
Monalube 215	5.0

Procedure:

Combine ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Amber Liquid

Viscosity (40C): 25 cS

Falex: 2250 Lbs./60 In.-Lbs.

Applications: For machining stamping and drawing.

Formulation F-792

Cutting Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	85.0
Monalube 205	5.0
Monalube 215	5.0
Monalube 225	5.0

Procedure:

Combine ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Amber Liquid

Viscosity/40C: 30 cS

Performance Data:

Falex (Direct Scale): 2750 Lbs./70 In.-Lbs.

Draw Bead Efficiency: 90

Draw Bead Efficiency Reference Oil: 115

Applications: Heavy drawing and stamping

Formulation F-793

SOURCE: Mona Industries, Inc.: Suggested Formulations

Cutting Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	90.0
Monalube 215	5.0
Monalube 225	5.0

Procedure:

Combine ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Amber Liquid

Viscosity 40C: 27 cS

Performance Data:

Falex (Direct Scale): 2500 Lbs./60 In.-Lbs.

Draw Bead Efficiency: 90

Draw Bead Efficiency Reference Oil: 115

Formulation F-794

Cutting Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	95.0
Monalube 225	5.0

Procedure:

Combine ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Amber Liquid

Viscosity 40C: 24 cS

Performance Data:

Falex (Direct Scale): 2750 Lbs./60 In.-Lbs.

Draw Bead Efficiency: 90

Draw Bead Efficiency Reference Oil: 115

Formulation F-795

Cutting Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	90.0
Monalube 215	5.0
Monalube 325	5.0

Procedure:

Combine ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Dark Brown Liquid

Viscosity 40C: 22 cS

Performance Data:

Falex (Direct Scale): 2250 Lbs./55 In.-Lbs.

Formulation F-796

SOURCE: Mona Industries, Inc.: Suggested Formulations

Cutting OilsSemi-Synthetic Cutting Oil

<u>Ingredients:</u>	<u>Weight%</u>
Aristonate M-LF	17.77
Oleic Acid	2.98
TEA	2.75
Propylene Glycol	15.04
Water	61.48

Comments about this formula:

1. Mix all of the ingredients, except the Propylene Glycol.
2. Add the water SLOWLY.
3. Add the Propylene Glycol last.

Formulation SOF-001-01

Cutting Oil Concentrate

<u>Ingredients:</u>	<u>Weight%</u>
Aristonate M	60.60
Dresinate 91	20.20
Igepal CO-430	0.10
KOH, 45%	1.25
Oleic Acid, Emersol 213 Oleic Acid	8.25
Diethylene Glycol	7.10
Water	2.50

Comments about this formula:

1. Soluble Oil - Dilute 1:3 with 100 SUS naphthenic oil.
2. Emulsion - Dilute 4:76 with 160 ppm hard water.

Formulation SOL-001-01

Cutting Oil Concentrate

<u>Ingredients:</u>	<u>Weight%</u>
Aristonate M	51.80
Neodol 25-3	21.60
TEA, 85%	4.50
Oleic Acid	8.50
Diethylene Glycol	8.60
Water	5.00

Comments about this formula:

1. Soluble Oil - Dilute 1:3 with 100 SUS naphthenic oil.
2. Emulsion - Dilute 4:76 with 160 ppm hard water.

Formulation SOL-002-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

General Purpose Machine Cleaner

This is an excellent all-purpose cleaner for cleaning all types of ferrous parts and machine surfaces. Monacor 4000 is incorporated for added corrosion protection.

<u>Ingredients:</u>	<u>Wt%</u>
Water	69.00
Triethanolamine	4.00
Monacor 4000	3.50
Monamine CF-100M	6.00
Monateric CyNa-50	6.00
Tetrasodium EDTA (40%)	10.00
Triadine 10 (Preservative)	1.50

Procedure:

Mix the ingredients in order at ambient temperature. Mix well between each addition at moderate speed.

Typical Properties:

Appearance: Clear amber liquid
 Specific Gravity: 1.06
 pH Concentrate: 10.2
 pH of a 1:10 solution: 9.8
 Recommended Use Dilution: 1:10 with water
 Cast Iron Block: Pass
 Corrosion Test: 1:10 Dilution
 Formulation F-770

Aircraft Cleaner Type IV

The following formulation uses Monamulse 653-83D as an emulsifier in a military specification (MIL-C-855706) formulation.

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
Monamulse 653-83D	7.0
Monamine I-76	2.7
Aromatic 150	7.5
Isopar M (Odorless Mineral Spirits)	7.5
Diethylene Glycol Butyl Ether	3.5
Decanol	1.6

Part B:	
Trisodium Phosphate (Dodecahydrate)	2.7
Water	55.1
Pluronic F98	1.8
Hycar 1422	10.6

Procedure:

Add ingredients of Part A & Part B separately with agitation. Add Part B to Part A. Agitate until uniform.

Typical Properties:

Appearance: Clear Liquid
 Formulation F-784

SOURCE: Mona Industries, Inc.: Suggested Formulations

General Purpose Synthetic Fluid (A)

<u>Ingredients:</u>	<u>Wt%</u>
Maslip 501 Basic	5.0
Maphos 8135	8.0
Mazon RI 4 A	8.0
Triethanolamine, 85%	12.0
Biocide	0.5
Water	Balance

Procedure:

1. Add ingredients as listed.
2. This fluid is for ferrous metals. The concentrate should be further diluted from 1:10 (heavy duty) to 1:40 (light duty) with water to form a ready-to-use fluid. For increased rust and stain protection, increase the amount of Mazon RI 4 A. For increased lubricity increase the amount of lubricant or extreme pressure additive.

General Purpose Synthetic Fluid (B)

<u>Ingredients:</u>	<u>Wt%</u>
Maslip 500	38.0
Mazon RI 8 B	12.0
Propylene Glycol	2.5
Tolytriazole (Climax)	2.5
Triethanolamine, 85%	10.0
Biocide	0.5
Water	Balance

Procedure:

1. Add ingredients as listed.
2. This fluid is for ferrous metals. The concentrate should be further diluted from 1:10 (heavy duty) to 1:40 (light duty) with water to form a ready-to-use fluid. For increased rust and stain protection, increase the amount of Mazon RI 8 B. For increased lubricity increase the amount of lubricant or extreme pressure additive.

Copper Machining Fluid

<u>Ingredients:</u>	<u>Wt%</u>
Macol 5100	15.0
Mazon RI 6	8.0
Maphos 8135	7.0
Potassium Hydroxide	6.0
Biocide	0.5
Water	Balance

Procedure:

Add ingredients as listed.

SOURCE: PPG Industries, Inc.: Suggested Formulations

General Purpose Synthetic Fluid (C)

<u>Ingredients:</u>	<u>Wt%</u>
Maslip 501 A	30.0
Mazon RI 8 B	12.0
Maphos 58	6.0
Triethanolamine, 85%	7.0
Biocide	0.5
Water	Balance

Procedure:

1. Add ingredients as listed.
2. This fluid is for ferrous metals. The concentrate should be further diluted from 1:10 (heavy duty) to 1:40 (light duty) with water to form a ready-to-use fluid. For increased rust and stain protection, increase the amount of Mazon RI 8 B. For increased lubricity increase the amount of lubricant or extreme pressure additive.

General Purpose Synthetic Fluid (D)

<u>Ingredients:</u>	<u>Wt%</u>
Maslip 501 Base	12.0
Mazon RI 8 A	25.0
Maphos 8135	5.0
Triethanolamine, 85%	12.0
Biocide	0.5
Water	Balance

Procedure:

1. Add ingredients as listed.
2. This fluid is for ferrous metals. The concentrate should be further diluted from 1:10 (heavy duty) to 1:40 (light duty) with water to form a ready-to-use fluid. For increased rust and stain protection, increase the amount of Mazon RI 8 A. For increased lubricity increase the amount of lubricant or extreme pressure additive.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Metal Cleaner
(Phosphate, Powder)

Soil-Drawing lubricant, animal fat and grease
Surface-Steel
Application Method-Spray
Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
*STPP	10.0
*Sodium Carbonate	25.0
**Alkoxylated linear alcohol nonionic surfactant (low foam)	5.0
Metso Beads 2048	30.0
Sodium Hydroxide Beads	30.0

Use: Heavy duty low-foaming metal cleaner which is good for a spray cleaning process.

Use Dilution: 0.8-1.5% bw (1-2 oz/gallon)

- * FMC
- ** Olin Polytergent S-305LF or
Rhone-Poulenc Igepal C0-530

Aluminum Cleaner
(Phosphate, Powder)

Soil-Light drawing oil
Surface-Aluminum
Application Method-Spray washer
Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Beads 2048	45.0
*STPP	30.0
*Sodium Bicarbonate	20.0
**Sodium Polyacrylate	3.0
***Octylphenoxy Polyethoxyethanol, 9-10 Moles EO	2.0

Use Dilution: 1.5-3.0% bw (2-4 oz/gal)

- * FMC
- ** Rohm & Haas Acusol 445ND (92% solids)
- *** Rhone-Poulenc Igepal CA-630

SOURCE: PQ Corp.: Detergent Formulation Guide

Metal Cleaner
(Phosphate, Powder)

Soil-Oil, drawing lubricant, animal fat and grease
Surface-Steel
Application Method-Immersion
Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
*Sodium Carbonate	20.0
*STPP	8.0
**Octylphenoxy Polyethoxyethanol (6 Moles EO)	2.0
Metso Beads 2048	30.0
Sodium Hydroxide Beads	40.0

Use Dilution: 2.3-4.5% bw (3-6 oz/gallon)

* FMC

** Rhone-Poulenc Igepal CA-630

Metal Cleaner
(Phosphate, Powder)

Soil-Oil, drawing lubricant, animal fat and grease
Surface-Steel
Application Method-Immersion/electrolytic cleaning
Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
TSPP	15.0
TSP	5.0
Metso Beads 2048	35.0
Sodium Carbonate	28.0
*Octylphenoxy Polyethoxyethanol (12-13 Moles EO)	2.0
Sodium Hydroxide Beads	15.0

Use Dilution: 2.3-4.5% bw (3-6 oz/gal)

* Rhone-Poulenc Igepal CA-720

SOURCE: PQ Corp.: Detergent Formulation Guide

Metal Cleaner
(Phosphate, Powder)

Soil-Oil, fat, protein
 Surface-Stainless steel
 Application Method-Cleaning in place
 Manufacture-Dry blend/Agglomeration

<u>Composition A:</u>	<u>Wt%</u>
*STPP	40.0
*Sodium Carbonate	12.0
**Liquid Nonionic Surfactant (C12-C13; 3 Moles EO)	3.0
Metso Beads 2048	25.0
Sodium Hydroxide Beads	20.0

<u>Composition B:</u>	<u>Wt%</u>
*STPP	40.0
*Sodium Carbonate	12.0
**Liquid Nonionic Surfactant (C12-C13; 3 Moles EO)	3.0
Metso Pentabead 20	45.0

Use Dilution: 1.5-3.0% bw (2-4 oz/gallon)

- * FMC
- ** Rhone-Poluenc Rhodasurf A-24

Metal Cleaner
(Zero Phosphate, Powder)

Soil-Oil, drawing lubricant, animal fat and grease
 Surface-Steel
 Application Method-Immersion
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Valfor 100 Zeolite A	15.0
Sodium Carbonate	38.0
*Octylphenoxy Polyethoxyethanol (9-10 Moles EO)	2.0
Metso Pentabead 20	43.0
Acusol 445ND Sodium Polyacrylate	2.0

Use Level: 3-6 oz/gallon

- * Rhone-Poulenc Igepal CA-630

SOURCE: PQ Corp.: Detergent Formulation Guide

Non-Phosphorous Aluminum Cleaner

This is a totally organic, phosphate-free aluminum cleaner that provides excellent cleaning and brightening of aluminum. The Avanel S-70 provides for removal of organic surface deposits and, by surface tension reduction, better contact between the aluminum surface and the organic acids. In addition to industrial applications like cleaning over-the-road aluminum trailers and aluminum prior to anodizing, this cleaner may also be used in household applications such as cleaning aluminum flashing, windows and door fixtures. Depending on the application, this product may be used in a pressure wash, pump spray or dip tank.

<u>Ingredients:</u>	<u>Wt%</u>
Citric Acid, 50%	12.0
Gluconic Acid, 50%	8.0
Avanel S-70	3.0
Deionized Water, Dye	Balance

Procedure:

Charge the water, citric acid, gluconic acid and Avanel S-70. Mix well. If dye is to be added, part of the water should be held out; and the dye added to this water with good agitation. The dissolved dye can then be added to the batch. NOTE: Certain dyes may not be stable under these conditions. Consequently, shelf stability tests should be performed.

Formulation CM-102

Alkaline Aluminum Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Deionized Water	87.0
Avanel S-70	4.0
Tetrapotassium Pyrophosphate	5.0
Sodium Metasilicate Pentahydrate	1.0
Macol 48	3.0

pH (as is): 11.5-12.5

Appearance: Clear, water-white liquid

Specific Gravity: 1.05

Procedure:

Charge the water and dissolve the builder salts under agitation. When dissolved, charge the remaining ingredients. Continue mixing for at least 15 minutes. NOTE: This alkaline aluminum cleaner has shown excellent cleaning properties without chemical attack of the metal. This formulation may be cut 1:1 with water to prepare a mild hard-surface cleaner.

Formulation CM-1034

SOURCE: PPG Industries, Inc.: Suggested Formulations

Semi Synthetic

This formulation is particularly useful for heavy machining and light drawing for ferrous and stainless steel.

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	9.0
Monalube 320	9.0
Monalube 610	13.6
Monalube 205	0.8
Monalube 215	0.8
Triethanolamine (99%)	3.2
Monacor BE	5.0
Water	58.6

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Falex (Direct Scale): 2500 Lbs./50 In.-Lbs.

Cast Iron Block Corrosion Test: Pass

Appearance: Clear

pH: 9.6

Formulation F-797

Semi Synthetic

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	9.0
Monalube 320	9.0
Monalube 610	13.6
Monalube 220	1.6
Triethanolamine (99%)	3.2
Monacor BE	5.0
Water	58.6

Procedure:

Mix items 1,2, and 3 until clear. Add items 4,5, and 6. 5% of concentrate to 95% water forms micro emulsion. Formulation can be used for grinding and light machining.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 9.5

Surface Tension (dynes/cm): 32

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./45 In.-Lbs.

Formulation F-800

SOURCE: Mona Industries, Inc.: Suggested Formulations

Semi Synthetic

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	10.0
Monalube 225	5.5
TEA	7.5
Monalube 610	25.0
Water	47.5

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in water):

Appearance: Clear Liquid

pH: 9.0

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2750 Lbs./55 In.-Lbs.

For machining light stamping and drawing.

Formulation F-799

Semi Synthetic

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	9.0
Monalube 320	9.0
Monalube 610	13.6
Monalube 205	1.6
Triethanolamine (99%)	3.2
Monacor BE	5.0
Water	58.6

Procedure:

Mix items 1, 2, and 3 until clear. Add items 4 and 5 then 6. 5% of concentrate added to water forms micro emulsion. Suggested for grinding and machining for both ferrous and nonferrous metals.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 9.5

Surface Tension: 27.0

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./57 In.-Lbs.

Formulation F-801

SOURCE: Mona Industries, Inc.: Suggested Formulations

Silver and Metal Polish

In addition to thickening, Carbopol resins impart yield value allowing particles, such as abrasives, to become permanently suspended. The resin also prevents "creaming" or phase separation by suspending and separating the oil droplets.

<u>Ingredient:</u>	<u>Wt%</u>
SF96 Silicone Fluid (350) (1)	1.00
Dow Corning 20 Release Coating (2)	2.00
Stoddard Solvent (3)	20.00
Prifac 2922 Lauric Acid	2.00
DI Water	43.48
Morpholine	0.86
Carbopol EZ-2 (4)	0.35
Ammonium hydroxide	0.31
Kaopolite Kaolin Clay (5)	14.00

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 10,000 cps
 Product pH: 8.50
 Product Clarity: Paste

Raw Material Suppliers:

- (1) General Electric
- (2) Dow Corning Corp.
- (3) Exxon Corp.
- (4) BFGoodrich
- (5) Kaopolite, Inc.

Procedure:

1. Add the silicone fluid, release coating, solvent, and lauric acid to a vessel. Mix using a high shear mixer.
2. Continue to mix, and add the water (43.48 parts) and the morpholine.
3. Disperse the Carbopol into the water (16.00 parts) by simply "dumping" it in. The polymer will wet out in a few minutes. Add the dispersion to the above mixture with good agitation.
4. Add the ammonium hydroxide to reach the target pH.
5. Add the clay and mix until uniform.

Total Actives:

Silicone fluid: 1.00
 Stoddard solvent: 20.00
 Release coating: 2.00
 Abrasive: 14.00

SOURCE: BFGoodrich Specialty Chemicals: DET-563

Soluble Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	60.0
Monalube 605	20.0
Paroil 160	20.0

Procedure:

Combine all ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Dark Brown

Performance Data (5% in water):

Appearance: Milky Liquid

pH: 8.5

Falex (Direct Scale): 2750 Lbs./60 In.-Lbs.

Above formulation for heavy duty machining and drawing for use on stainless steel and ferrous metals.
Formulation F-803

Soluble Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	85.0
Monalube 605	15.0

Procedure:

Combine above ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Light Brown Liquid

Performance Data (5% in water):

Appearance: Milky Emulsion

pH: 8.8

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 1750 Lbs./47 In.-Lbs.

Application:

For grinding and very light machining.

Formulation F-804

SOURCE: Mona Industries, Inc.: Suggested Formulations

Soluble Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	78.0
Monalube 605	15.0
Monalube 215	5.0
TEA	2.0

Procedure:

Mix above ingredients with agitation. Warm to 120F. If solution is slightly hazy, adjust with tall oil fatty acid.

Typical Properties:

Appearance: Milky Emulsion

Performance Data (5% in Water):

Appearance: Milky Emulsion

pH: 8.0

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./55 In.-Lbs.

The above formulation is suggested for grinding and light machining.

Formulation F-805

Soluble Oil

<u>Ingredients:</u>	<u>Wt%</u>
100 Pale Oil	85.0
Monalube 605	10.0
Monalube 215	5.0

Procedure:

Combine ingredients with agitation while warming to 50C.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Milky Emulsion

pH: 8.0

Falex (Direct Scale): 1250 Lbs./45 In.-Lbs.

The above formulation is suggested for grinding and light machining.

Formulation F-806

SOURCE: Mona Industries, Inc.: Suggested Formulations

Soluble Oil Machining Fluid

Monalube 225 provides lubricity, and EP properties in this machining fluid. This formulation was designed for machining carbon steel, brass, bronze copper and stainless steel.

<u>Ingredients:</u>	<u>Wt%</u>
Naphthenic Oil (100SUS/100)	72.0
Monalube 225	5.0
Monalube 605	20.0
Triethanolamine (99%)	3.0

Procedure:

Add in the order listed with agitation.

Falex EP Test:

Direct Load Scale: 2750 lbs
Torque: 47 inch pounds

Use Dilutions:

Grinding: 1-2% in water
Light Machining: 3-5% in water
Moderate Machining: 5-7% in water
Heavy Machining: 8-10% in water

Formula F-764

Synthetic Machining Fluid

This formulation is ideal for machining carbon steel, brass, bronze, copper, aluminum and stainless steel.

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 225	15.0
Triethanolamine (99%)	30.0
Water	55.0

Procedure:

Add in the order listed with agitation.

Falex EP Test Procedure:

Concentration: 20% Aqueous solution
Direct Load Scale 3000 lbs.
Torque 60 inch pounds

Formulation F-766

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 210	16.6
Triethanolamine (99%)	33.3
Water	50.0
Antifoam	0.1

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.5

Surface Tension: 42

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./56 In.-Lbs.

The formulation is designed for ferrous and nonferrous metals primarily for grinding.

Formulation F-819

Synthetic

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 210	12.5
Monalube 315	12.5
Triethanolamine (99%)	25.0
Water	50.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.0

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./56 In.-Lbs.

Formulation is designed for both ferrous and nonferrous systems primarily for grinding.

Formulation F-820

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Drawing/Stamping Fluid

This formulation is ideal for stamping hot or cold rolled steel.

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 225	15.0
Triethanolamine (99%)	30.0
Monalube 315	20.0
Water	35.0

Procedure:

Add in the order listed with agitation.

Falex EP Test Procedure:

Concentration: 20% Aqueous solution

Direct Load Scale 3000 lbs.

Torque 55 inch pounds

Formulation F-765

Oil Based Drawing/Stamping Fluid

Monalube 225 provides lubricity, EP and contributes to the corrosion protection properties in this heavy-duty stamping/drawing fluid.

<u>Ingredients:</u>	<u>Wt%</u>
Paraffinic Oil (300SUS/100)	90.0
Monalube 225	10.0

Procedure:

Blend Monalube 225 into the oil.

Falex EP Test:

Direct Load Scale: 3000 lbs

Torque 57 inch pounds

Formulation F-763

Spray Metal Cleaning Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Water	75.00
Sodium Metasilicate	3.00
Sodium Carbonate	4.00
Sodium Hydroxide	5.00
Monatropo 1250	11.00
Alkyl Polyalkylene Ether	2.00

Procedure:

Add in order listed with agitation, making sure each ingredient is dissolved before next addition.

Formulation F-751

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	5.0
Monalube 210	10.0
Triethanolamine (99%)	30.0
Water	55.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.7

Surface Tension: 27

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./47 In.-Lbs.

This formulation is designed for both ferrous and nonferrous systems for areas of machining and grinding at 10% for mild stamping.

Formulation F-813

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	5.0
Monalube 210	10.0
Monalube 315	10.0
Triethanolamine (99%)	30.0
Water	45.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.0

Surface Tension: 32

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2750 Lbs./57 In.-Lbs.

This formulation is designed for both ferrous and nonferrous systems for areas of machining and grinding at 10% for mild stamping.

Formulation F-814

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	4.5
Monalube 220	9.0
Triethanolamine (99%)	27.0
Monalube 315	20.0
Water	39.5

Procedure:

Mix items 1, 2, 3, and 4. Add water and mix until homogeneous.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Translucent Solution

pH: 9.0

Surface Tension: 32

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./47 In.-Lbs.

Formulation F-815

Synthetic Formula

Clear product designed for ferrous grinding.

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 210	15.0
Monalube 110	40.0
Water	45.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Solution

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 7.5

Falex (Direct Scale): 2500 Lbs./45 In.-Lbs.

Note: No TEA needed. Excess DEA in Monalube 110 neutralizes PE.

Formulation F-816

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formula

Product designed for grinding and light machining.

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 210	15.0
Triethanolamine (99%)	30.0
Monalube 315	10.0
Water	45.0

Procedure:
Combine ingredients with agitation.

Typical Properties:
Appearance: Clear Amber Liquid

Performance Data (5% in Water):
Appearance: Clear Liquid
pH: 8.0
Cast Iron Block Corrosion Test: Pass
Falex (Direct Scale): 2500 Lbs./45 In.-Lbs.
Formulation F-817

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 215	16.6
Triethanolamine (99%)	33.3
Antifoam	0.1
Water	50.0

Procedure:
Combine ingredients with agitation.

Typical Properties:
Appearance: Clear Amber Liquid

Performance Data (5% in Water):
Appearance: Clear Liquid
pH: 8.5
Surface Tension: 42
Falex (Direct Scale): 2500 Lbs./44 In.-Lbs.

Product designed for machining ferrous and nonferrous metal.
Also some very light stamping.
Formulation F-818

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 210	16.6
Monoethanolamine	33.3
Water	50.1

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 11

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2250 Lbs./58 In.-Lbs.

Formulated for grinding applications. Ferrous metals only.
Formulation F-821

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	16.6
Triethanolamine (99%)	33.3
Antifoam	0.1
Water	50.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.3

Surface Tension (dynes/cm): 24

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./55 In.-Lbs.

This is the most universal formula since it can be used on all metallurgy at 1% to 2%. It also can be used for grinding at 5% to 8% for machining and at 8% to 15% for real heavy machining.
Formulation F-822

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	10.0
Monalube 110	30.0
Water	60.0

Procedure:
Combine ingredients with agitation.

Typical Properties:
Appearance: Clear Solution

Performance Data (5% in Water):
Appearance: Clear Liquid
pH: 8.0
Surface Tension: 28
Cast Iron Block Corrosion Test: Pass
Falex (Direct Scale): 2250 Lbs./50 In.-Lbs.

For use in machining and light stamping for ferrous and nonferrous metals.
NOTE: Excess DEA in Monalube 110 is enough to neutralize the phosphate ester.
Formulation F-823

Synthetic Formula

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	25.0
Monoethanolamine	25.0
Water	50.0

Procedure:
Combine ingredients with agitation.

Typical Properties:
Appearance: Clear Amber Liquid

Performance Data (5% in Water):
Appearance: Clear Liquid
pH: 10
Cast Iron Block: Pass
Falex (Direct Scale): 2000 Lbs./50 In.-Lbs.

For ferrous systems for machining and grinding.
Formulation F-824

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formulation

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 210	10.0
Monalube 225	10.0
TEA	40.0
Water	40.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.5

Surface Tension (dynes/cm): 42

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./46 In.-Lbs.

For machining, forming, and stamping all metals.

Formulation F-807

Synthetic Formulation

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 225	15.0
Monalube 310	25.0
Triethanolamine (99%)	30.0
Water	30.0

Procedure:

Mix Monalube 225 with triethanolamine and add Monalube 315.
Mix until clear, then add water.

Typical Properties:

Appearance: Clear Concentrate

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.6

Surface Tension: 41

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2750 Lbs./55 In.-Lbs.

For heavy duty stamping of ferrous metals at 10 to 20% in water.

Formulation F-808

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formulation

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	5.0
Monalube 210	10.0
Monalube 220	10.0
Triethanolamine (99%)	50.0
Water	25.0

Procedure:

Mix items 1, 2, 3, and 4. Then add water.

Typical Properties:

Appearance: Clear Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 9.0

Surface Tension: 32

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2750 Lbs./57 In.-Lbs.

For stamping, drawing and broacing 10 to 20% in water.

Formulation F-809

Synthetic Formulation

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	5.0
Monalube 225	10.0
Triethanolamine (99%)	30.0
Water	55.0

Procedure:

Mix items 1, 2, 3, and 4, then add water and mix.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.7

Surface Tension: 35

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2250 Lbs./51 In.-Lbs.

Application:

For ferrous and nonferrous systems for machining, forming, and stamping.

Formulation F-810

SOURCE: Mona Industries, Inc.: Suggested Formulations

Synthetic Formulation

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 215	9.0
Monalube 220	9.0
Triethanolamine (99%)	36.0
Water	46.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 9.0

Surface Tension: 42

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./47 In.-Lbs.

Use in machining and stamping for both ferrous and nonferrous metallurgy.

Formulation F-811

Synthetic Formulation

<u>Ingredients:</u>	<u>Wt%</u>
Monalube 205	5.0
Monalube 220	10.0
Triethanolamine (99%)	30.0
Water	55.0

Procedure:

Combine ingredients with agitation.

Typical Properties:

Appearance: Clear Amber Liquid

Performance Data (5% in Water):

Appearance: Clear Liquid

pH: 8.7

Surface Tension: 35

Cast Iron Block Corrosion Test: Pass

Falex (Direct Scale): 2500 Lbs./35 In.-Lbs.

For machining, forming, and stamping for all metallurgy.

Formulation F-812

SOURCE: Mona Industries, Inc.: Suggested Formulations

Universal Scouring Paste

<u>Ingredients:</u>	<u>Wt%</u>
A: Tylose CBR 10000	5.00
B: Water (50C)	51.80
C: Hostapur SAS 60	21.80
Genapol ZRO liquid	10.70
Genapol UD-030	2.00
Komperlan KD	0.70
NaCl	8.00
D: Preservative, Perfume	q.s.

Manufacturing:

- I. A, which is added by continuing stirring, should swell, until a homogeneous gel free of lumps has been obtained.
- II. Add one after another, the components of C to I.
- III. Finally D is added.

Tests:

Viscosity (Brookfield RVT, sp. 6, 10 min -1, 25C): 49000 mPas

SOURCE: Hoechst Aktiengesellschaft: Suggested Formulation

Aluminum Cleaner

<u>Composition:</u>	<u>Wt%</u>
Kelzan xanthan gum	1.0
Butyl Cellosolve	4.0
Tergitol NP	3.0
Phosphoric Acid (85%)	3.0
Citric Acid	4.0
Sodium Dichromate	trace
Water	85.0

Procedure:

Dissolve Kelzan xanthan gum in water. Add the citric and phosphoric acids followed by Butyl Cellosolve and Tergitol NP. To use, spread evenly on the surface to be cleaned and allow sufficient time for the cleaning action to be accomplished.

SOURCE: Monsanto Performance Materials: Kelzan Suggested Formulation

Water Soluble Stamping Fluid

<u>Ingredients:</u>	<u>Wt%</u>
Maslip 501 Base	30.0
Mazon RI 8 B	12.0
Diethanolamine	8.8
Propylene Glycol	1.2
Triethanolamine, 85%	10.0
Water	Balance

Procedure:

Add ingredients as listed. If more lubricity is required, add Macol 5100. If more corrosion inhibitor is required, add more Mazon RI 8 B. Use 10:1 dilution rate for heavy duty application.

WD-40 Type Lubricant Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
S-Maz 80	3.7
Mazawet 77	1.0
Hitec E-515 (Ethyl)	5.2
Palmetic Acid	0.7
Shellflex 213	10.5
Shell Sol 135	78.9

Procedure: Add ingredients as listed.

Penetrating Oil

<u>Ingredients:</u>	<u>Wt%</u>
S-Maz 80	2- 6
Mazon RI 6	7-12
Masil SF-10	0- 1
Nekal WT-27	0- 1
Gafac RE-40	0- 1
Indopol H-100	0- 6
Odorless Mineral Spirits	Balance

Procedure:

Add ingredients as listed. NOTE: A portion of the mineral spirits may be deleted and substituted with a naphthenic oil (5-15%).

Burnishing Compound

<u>Ingredients:</u>	<u>Wt%</u>
Mazamide 65	10.0
Mafo 13 MOD 1	7.0
Mazon RI 4 A	5.0
Trisodium Phosphate	7.0
EDTA	1.0
Water	70.0

Procedure: Add ingredients as listed.

SOURCE: PPG Industries, Inc.: Suggested Formulations

10. Oven, Grill and Hot Plate Cleaners

Caustic Oven Cleaner

<u>Ingredients:</u>	<u>Wt%*</u>
A: Van Gel C, 4.8% Aqueous Dispersion	62.50
Deionized Water	15.75
B: Sodium Hydroxide, 50% Solution	5.00
C: Butyl Carbitol	10.00
Aminomethyl Propanol (AMP-95)	1.50
Sodium Cocoamphoacetate (Monateric CM-36S)	0.25
D. Sodium Hydroxide, 50% Solution	5.00

Procedure:

1. Make the 4.8% Van Gel C dispersion by slowly adding 4.8 parts by weight of Van Gel C into 95.2 parts by weight of water of at room temperature, while mixing with a homogenizer at 5000 rpm. Continue mixing for 60 minutes. Add the remaining Part A water to the indicated amount of dispersion and mix until uniform.
 2. Slowly add Part B and adjust homogenizer speed as required to achieve good mixing of entire batch.
 3. Add the Part C ingredients in the order listed, mixing each until uniform. Avoid entrapment of air and generation of foam.
 4. Slowly add Part D and mix until uniform.
- Formulation No. 461

Non-Caustic Oven Cleaner

<u>Ingredients:</u>	<u>Wt%*</u>
A: Water	55.00
Van Gel C, Magnesium Aluminum Silicate	0.75
Rhodopol 50MD, Xanthan Gum	0.25
B: Diethanolamine	5.00
Triethanolamine	5.00
Tripropyleneglycol Methyl Ether (Dowanol TPM)	5.00
Potassium Carbonate, 25% Aqueous Solution	28.00
Vanseal NACS-30, Sodium Lauroyl Sarcosinate	1.00

Procedure:

1. Dry blend the Van Gel C and Rhodopol 50MD and add the mixture to the water while stirring with a homogenizer operating at 5000 rpm. Continue mixing for 30 minutes.
2. Slowly add the remaining ingredients in the order shown. Mix each for 5 minutes. Package.

Formulation No. 468

*As received basis

SOURCE: R.T. Vanderbilt Co., Inc.: Suggested Formulations

High Caustic Oven Cleaner

Carbopol resins are used to thicken this high caustic formulation. In addition, the use of the resin provides vertical cling to increase the contact time of the detergent on the soiled surface and enhance consumer convenience.

<u>Ingredient:</u>	<u>Weight Percent</u>	
DI Water	71.03	69.78
Carbopol 674 (1)	0.75	2.00
Potassium hydroxide (45%)	22.22	22.22
Propylene glycol methyl ether (2)	3.00	3.00
C8-16 alkyl polyglycoside (50%) (3)	3.00	3.00
Brookfield viscosity (RVT-20 rpm):	250	5,000
	cps	cps
Product pH:	13-14	13-14
Product clarity:	Clear	Clear

(1) BFGoodrich

(2) Dow Chemical: Dowanol PM

(3) Henkel Corp.: Glucopon 425CS

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Carbopol resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add the potassium hydroxide with continuous mixing.
3. Add the glycol ether.
4. Add the APG surfactant. Mix until homogeneous.
5. Add fragrance, as desired.

Total Actives:

Potassium hydroxide: 10.00
 Propylene glycol methyl ether: 3.00
 C8-16 alkyl polyglycoside: 1.50

SOURCE: BFGoodrich Specialty Chemicals: DET-360

Oven Cleaner

<u>Ingredients:</u>	<u>Wt%*</u>
A: Veegum T, Magnesium Aluminum Silicate	0.40
Rhodopol 23, Xanthan Gum	1.20
Deionized Water	80.40
B: Sodium Hydroxide, 50%	8.00
Deceth-4 Phosphate (Rhodafac RA-600)	10.00

Procedure:

1. Weigh the water, heat it to 85-90C and mix with an homogenizer at 5000 rpm.
 2. Dry blend the Veegum T and Rhodopol 23 and slowly add them to the water. Continue mixing for 20 minutes.
 3. Move the batch to a propeller mixer and adjust the speed to produce a small vortex. Cool to 55C.
 4. Add the Part B ingredients in the order shown, mixing for 5 minutes after each addition.
- NOTE: It is particularly important that the Sodium Hydroxide solution be added very slowly with good mixing of the entire batch.

Formulation from Rhone-Poulenc Surfactants & Specialties

Aerosol Oven Cleaner

<u>Ingredients:</u>	<u>Wt.%*</u>
A: Veegum T, Magnesium Aluminum Silicate	1.50
Deionized Water	74.25
B: n-Methyl Pyrrolidone (M-Pyrol)	20.00
Disodium Cocoamphodipropionate (Miranol C2M-SF Conc.)	3.25
Nonoxynol (Igepal CO-630)	1.00

Procedure:

1. Weigh water and place on homogenizer.
2. Disperse the Veegum T in the water using a homogenizer at 5000 rpm. Continue mixing for 20 minutes, while heating to 70C.
3. Combine the ingredients of Part B, heat to 70C.
4. Move the batch to a propeller mixer and adjust the speed to provide a slight vortex.
5. Add Part B to Part A and cool while mixing to 30C.
6. Package in aerosol can using Propane/Butane propellant.

Formulation from International Specialty Products.

*As received basis

SOURCE: R.T. Vanderbilt Co., Inc.: Suggested Formulations

Oven Cleaner

<u>Composition:</u>	<u>Wt%</u>
Kelzan xanthan gum	0.1
Trisodium Phosphate	3.2
Sodium metasilicate	1.1
Sulfonate OA5	2.1
Brij 96	3.2
Silicone 200 Fluid 350 cs	4.0
Hexane	4.2
Water	82.1

Procedure:

Prepare water solution of Kelzan xanthan gum as before and add next three ingredients. Mix the Brij 96, Silicone and hexane separately. Then add water solution to the silicone/hexane mix with constant agitation. For aerosol use charge with 90% concentrate and 10% Genetron 12.

Heavy Duty Oven Cleaner

<u>Composition:</u>	<u>Wt%</u>
Kelzan xanthan gum	0.3
Antaron FC-34	2.0
Sodium hydroxide	10.0
Water	87.0

Procedure:

Prepare water solution of Kelzan xanthan gum then add Antaron. Separately, prepare the 40% sodium hydroxide solution and slowly add to mix. For aerosol use charge with 80% mixture and 20% of 1:1 mix of Genetron 12 and 114.

SOURCE: Monsanto Performance Materials: Technical Bulletin I-20:
Kelzan Formulations

Oven Cleaner w/Amphoteric

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	71.6
Sodium Citrate	2.1
Sodium Metasilicate	4.2
Sodium Hydroxide, 40%	6.5
Monoethanolamine	4.2
Dowanol PM	3.1
Rewoteric AM HC	3.1
Witco 1298SA	3.1
DeSonic 9N	2.1

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 96
pH: 13.9
Formula 1114

Oven Cleaner w/Phosphate

<u>Ingredients:</u>	<u>Wt%</u>
Phase I:	
Water, D.I.	71.4
Carbopol 940	1.3
Phase II:	
Water, D.I.	15.4
Potassium Hydroxide, 87%	2.4
Tetrapotassium Pyrophosphate	3.6
Phase III:	
Rewoteric AM HC	5.9

Blending Procedure:

Combine Phase I ingredients and mix until homogeneous. Combine Phase II ingredients in separate vessel and mix thoroughly. While mixing, pour Phase II into Phase I. Mix thoroughly then add Phase III.
Formula 1115

SOURCE: Witco Corp.: Suggested Formulations

11. Polishes, Coatings and Finishes

Furniture Polish

In addition to thickening, Carbopol resins impart yield value allowing particles, such as abrasives, to become permanently suspended. The resin also prevents "creaming" or phase separation by suspending and separating the oil droplets.

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
DI Water	91.10
Carbopol EZ-2 (1)	0.20
TEA	0.20
Part B:	
Cardis 36 Wax (2)	0.25
Hoechst Wax S (3)	0.25
Oleic Acid	0.08
Morpholine	0.10
DI Water	1.82
Part C:	
SM2133 Silicone Emulsion (4)	4.00
SM2135 Silicone Emulsion (4)	2.00

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 9,500 cps

Product pH: 7.00

Product Clarity: Polish

Raw Material Suppliers:

- (1) BF Goodrich
- (2) Petrolite Specialty Polymers
- (3) Hoechst Celanese
- (4) General Electric

Procedure:

1. Disperse the Carbopol into the water by simply "dumping" it in. The polymer will wet out in a few minutes.
2. Add the TEA. Mix until homogeneous.
3. Prepare Part B. Add the Cardis Wax, Hoechst Wax S, and oleic acid to a vessel. With mild stirring, bring the temperature up to 96-100C. When melted, add the morpholine until the mixture is homogeneous. Add the water at 95C. Continue stirring until the temperature reaches 45C. Cool to room temperature.
4. Add Part B.
5. Add in the silicone emulsions with mild mixing.

Total Actives:

Total Wax: 0.50
Total Silicone: 6.00

SOURCE: BFGoodrich Specialty Chemicals: DET-530

Leather/Plastic Polish

In addition to thickening, Carbopol resins impart yield value allowing particles, such as abrasives, to become permanently suspended. The resin also prevents "creaming" or phase separation by suspending and separating the oil droplets.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	50.00
Renex 20 (1)	2.00
Morpholine	1.00
SF96 Silicone Fluid (350) (2)	5.00
Oleic Acid	2.00
Mineral Spirits	20.00
DI Water	19.60
Carbopol EZ-2 (3)	0.40

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 3,200 cps

Product pH: 8.5

Product Clarity: Opaque

Raw Material Suppliers:

- (1) ICI Surfactants
- (2) General Electric
- (3) BFGoodrich

Procedure:

1. Dissolve the Renex 20 and morpholine in the water with mild agitation.
2. Dissolve the silicone fluid and the oleic acid in the mineral spirits. Add to the above mixture with good agitation.
3. In a separate vessel, disperse 0.40 parts of Carbopol into 19.60 parts of water by simply "dumping" the polymer into the water. In just a few minutes, the polymer will completely wet out. Add this dispersion to the above mixture.
4. Mix until homogeneous.

Total Actives:

Silicone Fluid: 5.00

Mineral Spirits: 20.00

SOURCE: BFGoodrich Specialty Chemicals: DET-540

Marble Polish

In addition to thickening, Carbopol resins impart yield value allowing particles, such as abrasives, to become permanently suspended. The resin also prevents "creaming" or phase separation by suspending and separating the oil droplets.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	74.80
Carbopol EZ-2 (1)	0.20
Mineral Spirits	15.00
Igepal 630 (2)	3.70
Diatomaceous earth (3)	6.00
Triethanolamine	0.30

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 11,700 cp

Product pH: 7.50

Product Clarity: Opaque

Raw Material Suppliers:

(1) BFGoodrich

(2) Rhone-Poulenc

(3) Kaopolite

Procedure:

1. Disperse the Carbopol in the water by simply "dumping" it in. The polymer will wet out in a few minutes. Add the surfactant while mixing under moderate agitation.
 2. Add the mineral spirits. Mix until the emulsion becomes homogeneous.
 3. Add the TEA. Mix until smooth.
 4. Add the diatomaceous earth. Mix until homogeneous.
- DET-552

Rust Removing Polish

Carbopol resins are used in this formula to thicken the gluconic acid to enable improved application efficacy. The polymer will also impart vertical cling to enable applications on vertical or angled surfaces.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	44.64
Carbopol EZ-2 (1)	1.79
Sodium hydroxide (50%)	35.71
Gluconic acid solution (50%) (2)	17.86

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 3,000 cp

Product pH: 13.90

Product Clarity: Translucent

Procedure:

1. Disperse the Carbopol into the water.
 2. Add the sodium hydroxide with agitation. Thickening will occur immediately.
 3. Add the gluconic acid solution. Mix until homogeneous.
- DET-560

SOURCE: BFGoodrich Specialty Chemicals: Suggested Formulations

Scratched Wood Polish

<u>Ingredients:</u>	<u>Wt%</u>
A: Veegum T, Magnesium Aluminum Silicate	1.50
Deionized Water	31.25
B: Stearic Acid	4.50
Carnauba Wax	16.50
Beeswax, Yellow	16.50
C: Triethanolamine, 99%	2.75
Mineral Spirits	27.00
D: Preservative, Dye, Fragrance	q.s.

Procedure:

1. Weigh the water and mix with a propeller mixer at 1800 rpm.
 2. Slowly add the Veegum T and mix for 20 minutes while heating to 90C.
 3. Combine the Part B ingredients and heat to 90C.
 4. Add the Part C ingredients to the Part B mixture in the order shown, mixing each for 10 minutes.
 5. Add Part B+C to Part A and mix for 10 minutes.
 6. Cool the batch to 35C, add Part D, and mix until uniform.
- *As received basis

SOURCE: R.T. Vanderbilt Co., Inc.: Formulation No. 210

High Gloss, Detergent Resistant Polish

A wax-free polish, which provides a high-gloss, detergent resistant finish on non-porous substrates. Simple application, without hard rubbing or buffing, results in both depth of gloss and detergent resistance for extended protection.

<u>Ingredients:</u>	<u>Wt%</u>
(1) GP-121 Silicone Polish Additive	9.0
(2) GP-RA-159 Silicone Polish Additive	1.5
(3) Stoddard Solvent	3.5
(4) Mineral Spirits (Odorless)	3.5
(5) GP-227 Silicone Surfactant Solution	9.0
(6) Kaopolite SF	3.4
(7) Soft Water	70.0
(8) Bactericide	0.1

Combine in order shown with high shear mixing until thickening occurs. Mix until homogeneous and package.

Formulation Properties:

Contains no wax	Non-smearing
High gloss	Cost efficient
Detergent resistant	Cold blend (Only mixing required)
Easily applied	Resistant to wash-off

SOURCE: Genesee Polymers Corp.: Formula 20-12

12. Rinse Aids

Rinse Aid, Acid

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	50.0
Petro 22 Powder	5.0
DeSonic LFD-97	35.0
Hydroxyacetic Acid, 70%	10.0

Blending Procedure:

Blend ingredients in the order listed.

Typical Properties:

Specific Gravity: 1.105
 Wt/Gal, lbs: 9.21
 Viscosity, cps: 85
 Cloud Point, C: 59
 Solids, %: 40

Formula 131

Rinse Aid

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	60.0
Petro 22 Powder	5.0
DeSonic LFD-97	35.0

Typical Properties:

Specific Gravity: 1.029
 Wt/Gal, lbs: 8.58
 pH, as is: 6.4
 Viscosity, cps: 80
 Cloud Point, C: 68
 Solids: 40%

Formula 130

SOURCE: Witco Corp.: Suggested Formulations

13. Rug, Floor, Carpet, Upholstery Shampoos and Cleaners

Carpet Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	56.0
Trisodium Phosphate	15.0
Tetrapotassium Pyrophosphate	10.0
Plurafac D-25	7.0
Alipal CO-436	10.0
Mazawet 77	1.25
EDTA (Tetrasodium Salt)	0.5
Tinopal 5 BM	0.25

Procedure:

Add ingredients as listed.

Low Foam Carpet Shampoo

<u>Ingredients:</u>	<u>Wt%</u>
Macol 2LF	6.0
Ethylene Glycol Methyl Ether	10.0
Sodium Tripolyphosphate	1.0
Sodium Xylene Sulfonate	1.0
Mazu DF 210 SX	0.5
Water (soft)	81.5

Procedure:

Add ingredients as listed.

Steam Rug Cleaner-A

<u>Ingredients:</u>	<u>Wt%</u>
Macol OP 10 SP	5.0
Sodium Silicate	10.0
Sodium Xylene Sulfonate	5.0
Water	80.0

Procedure:

Add ingredients as listed.

Steam Rug Cleaner-B

<u>Ingredients:</u>	<u>Wt%</u>
Macol OP 10 SP	3.0
Sodium Silicate	10.0
Sodium Xylene Sulfonate	3.0
Water	84.0

Procedure:

Add ingredients as listed.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Carpet Cleaners for the Spray-Extraction Process

<u>Ingredients:</u>	<u>Wt%</u>
Cublen D 50	1.0
Tetrapotassium pyrophosphate	5.0
Propetal 241	2.0
Propetal 281	3.0
Sulfetal 4105	4.0
Isopropanol	4.0
Water	81.0
Formula CT 02-08-01	

<u>Ingredients:</u>	<u>Wt%</u>
Water	75.0
Soap	1.0
Sulfetal 4105	5.0
Propetal 99	5.0
Contraspum 300	1.0
Ubato1 TR 1138	3.0
Isopropanol	10.0
Formula CT 02-08-02	

SOURCE: Zschimmer & Schwarz GmbH & Co.: General Formulations

Carpet Shampoo
Liquid, transparent

<u>Ingredients:</u>	<u>Wt%</u>
A: Hostapur OS liquid	25.00
Medialan KA conc.	3.00
B: Water, Preservative	72.00

Manufacturing:
One after another, the components of A are added to B.

SOURCE: Hoechst Aktiengesellschaft: Suggested Formulation

Carpet Shampoo
(Phosphate, Liquid)

Soil-Food (fat and protein), petroleum oil and grease, clay
and particulate
Surface-Polyester and nylon
Application Method-Rug scrubber
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	62.5
*TSP	2.0
*STPP	5.0
Kasil #6 Potassium Silicate	20.0
**Phosphate Ester	3.0
***Sodium Alkyl naphthalene Sulfonate	3.5
****Octylphenoxy Polyethoxyethanol, 7-8 Moles EO	4.0

Use Dilution: 0.8-1.5% bw (1-2 oz/gallon)

* FMC
** Rhone-Poulenc Rhodafac RE-610
*** DeSoto
**** Rhone-Poulenc Igepal CA-620

Rug Steam Cleaner

Soil-Food (fat and protein), petroleum oil and grease, clay
and particulate
Surface-Polyester and nylon
Application Method-Rug scrubber
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	84.0
Metso Beads 2048	5.0
Sodium Xylene Sulfonate, 40%	6.0
*Miranol JEM Concentrate (34%)	5.0

Use Dilution: 4.7-9.4% bw (6-12 oz/gallon)

*Rhone-Poulenc; or Shell Chemical Neodol 25-12

SOURCE: PQ Corp.: Detergent Formulation Guide

Carpet Shampoo, High Foam

<u>Ingredients:</u>	<u>Wt%</u>
Water	78.3
Petro BAF Liquid	5.0
Witcolate WAC-LA	16.7

Blending Procedure: Blend ingredients in the order listed.

Petro BAF, in combination with sodium lauryl sulfate, reduces the low temperature cloud point, giving excellent freeze/thaw properties. The Petro BAF combination dries less tacky than sodium lauryl sulfate alone.

Formula 908

Carpet Shampoo, High Foam

<u>Ingredients:</u>	<u>Wt%</u>
Water	71.1
Petro BAF Liquid	6.7
Witcolate WAC-LA	22.2

Blending Procedure: Blend ingredients in the order listed.

Use Level: 1 to 2 ounces per gallon.

Comments:

Petro BAF, in combination with sodium lauryl sulfate, reduces the low temperature cloud point, giving excellent freeze/thaw properties. The Petro BAF combination dries less tacky than sodium lauryl sulfate alone.

Formula 910

Carpet Spot Remover

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	90.3
Witcolate WAC-LA	3.3
Petro BA Liquid	0.5
Glycol Ether DPM	3.5
Glycol Ether PM	2.3
FC-129 (1% Solids)	0.1

Blending Procedure: Blend ingredients in the order listed.

Typical Properties:

Specific Gravity: 0.999

Wt./Gal. lbs.: 8.33

pH: 10.35

Use Dilution: Use as is

Formula 945

SOURCE: Witco Corp.: Suggested Formulations

Carpet & Upholstery Cleaner

This general purpose stain remover formulation is particularly effective in removing oil stains.

<u>Ingredient:</u>	<u>Wt%</u>
Deionized Water (hot)	37.0
SMA-2625 Resin	2.4
Aqua Ammonia	0.7
Witcolate WACLA	18.0
Witconate 60T Liquid	4.0
Avanel S-70	4.0
Deionized Water	34.0
Dye, Fragrance, etc.	Q.S.
pH (as is): 8.0-9.0	
Appearance: Clear liquid	
Specific Gravity: 1.016	

Procedure:

1. Charge the hot water to a mixing vessel and start agitation. Slowly sift in the SMA-2625 Resin to avoid clumping. Add the Aqua Ammonia, apply cooling, and mix well until the resin is dissolved.
2. Reduce agitation and add the remaining ingredients. Stop agitation to permit deaeration of the product prior to filling off.
3. If this product is to be colored, a portion of the final water should be reserved for dissolving the dye. After the dye is thoroughly mixed, the dye solution may be added.

NOTE: Use "as is" on carpeting. Dilute 10:1 and 5:1 with water for upholstery.

Vinyl Dressing (B)

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
Masil EM 250 C	18.0
Masil EM 10,000 C	10.0
Deionized Water	30.0
Part B:	
Macol OP-10 SP	2.0
Glycerine	1.0
Deionized Water	38.0
Sodium Benzoate	1.0

Procedure:

1. To a mixing vessel, charge the Masil EM 250 C and Masil EM 10,000 C. Start gentle agitation. Slowly add the water so as not to break the emulsion.
2. In a separate mixing vessel, charge the Macol OP-10 SP and glycerine to the water. Mix with gentle agitation until all components are dissolved, and the solution is free of "fish eyes". Charge the sodium benzoate and mix until dissolved.
3. Under gentle agitation, add Part B to Part A. Continue mixing gently to avoid air entrapment. NOTE: This formula is designed to be used "as is". If desired, UV absorbers and other components may be added to the formulation.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Carpet & Upholstery Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Deionized Water (Hot)	37.0
SMA-2625 Resin	2.37
Aqua Ammonia	0.67
Sodium Lauryl Sulfate	18.0
Richamide 5725	4.0
Avanel S-70	4.0
Deionized Water	33.96
Dye, Fragrance, Etc.	As desired

pH (as is): 8.0-9.0

Appearance: Clear liquid

Specific Gravity: 1.016

Procedure:

Charge the hot water to the mixing vessel and start agitation. Slowly sift in the SMA-2625 resin to avoid clumping. Add the Aqua Ammonia, apply cooling and mix well until the resin is dissolved. Reduce agitation and add the remaining ingredients. If the product is to be colored, a portion of the final water should be reserved for dissolving the dye. After the dye is thoroughly mixed, the dye solution may be added to the product. Stop agitation to permit deaeration of the product prior to filling off.

Notes:

This is a general purpose oily stain remover. This formulation is particularly effective at removing oil stains. Use as-is on carpeting. Dilute 10:1 and 5:1 with water for upholstery.

Note: The dye should be thoroughly screened to avoid fabric staining.

Formulation CP-101

**Liquid Steam Carpet Cleaner
For Hard Water Systems**

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Metasilicate A	7.5
Tetrapotassium Pyrophosphate	12.5
Emphos PS-331	4.0
Macol NP 11	1.0
Deionized Water	76.0

Procedure:

Add ingredients as listed.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Floor Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Mazamide 1281	8.0
Sodium Tripolyphosphate	2.0
Tetrapotassium Pyrophosphate	2.0
Water	88.0

Procedure:

Add ingredients as listed.

Liquid Floor Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Macol NP 9.5	7.0
Sodium Tripolyphosphate	8.0
Trisodium Phosphate	2.0
Sodium Metasilicate Pentahydrate	2.0
Maphos 60A	3.0
Water	78.0

Procedure:

Add ingredients as listed.

NOTE: This formulation is stable to 120F.

Heavy-Duty Floor Scrubber

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Metasilicate	2.0
Tetrasodium Pyrophosphate	18.0
Emphos PS-331	15.0
Deionized Water	53.95
Mazamide 1281	6.0
Sodium Hydroxide, 50%	5.05

Procedure:

Add ingredients as listed.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Household Carpet Freshener/Antistat

<u>Ingredients:</u>	<u>Wt%</u>
Part A:	
Puffed Borax (10 lbs/cu ft)	1.8
Fragrance	0.2
Sodium Bicarbonate	15.0
Larostat 519	3.0

Part B:	
Sodium Bicarbonate	80.0

Procedure:

In a ribbon mixer or V-blender, charge the puffed borax and first portion of sodium bicarbonate. Start mixing and slowly add the fragrance. After all of the fragrance has been added, continue mixing for 5 minutes to complete absorption. Add the Larostat 519 and the remaining sodium bicarbonate. Mix for 15 minutes more.

Notes:

This is a powdered combination consumer freshener/antistat. The product is designed to be shaken onto the carpet, lightly rubbed into the carpet and then the excess removed by vacuuming.
Formulation SP-101

Pump Spray Carpet Antistat

<u>Ingredients:</u>	<u>Wt%</u>
Part A:	
Water	94.3
Isopropyl Alcohol	5.0
Larostat 264 A	0.7

Appearance: Clear, water-white to pale-yellow liquid
Specific Gravity: 0.98

Procedure:

To a mixing vessel, charge the water, followed by the isopropyl alcohol and Larostat 88. Mix until clear.

Notes:

This is a non-aerosol, pump spray carpet antistat for the removal of nuisance static. To remove static from carpeting and other surfaces, spray lightly with this formulation. It is not necessary to saturate the surface. If additional protection is needed, it is preferable to have repeat applications rather than one, to insure even treatment.

Formulation SP-102

SOURCE: PPG Industries, Inc.: Suggested Formulations

Liquid Leather, Vinyl, and Plastic Cleaner and Restorer

<u>Ingredients:</u>	<u>Wt%</u>
DeSonic 9N	10.0
Dowanol PM Glycol Ether	5.0
Isopropyl Alcohol	2.5
Amyl Acetate	1.0
Water	81.5

Blending Instructions:

Combine ingredients in the order shown and mix thoroughly.

Use Instructions:

Apply finished product to a towel or towellete (Kimwipe, etc.) and wipe onto the surface to be cleaned, then rinse. Alternatively, spray onto the surface to be cleaned, allow to set a few minutes, then rinse or hose off.

Product Information:

Product:	Benefit:
DeSonic 9N	Detergent and degreaser
Dowanol PM Glycol Ether	Solvent and coupling agent
Amyl Acetate	Solvent
Isopropyl Alcohol	Solvent
Formula 1000	

Liquid Leather, Vinyl, and Plastic Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Witconol NP-100	10.0
Dowanol PM Glycol Ether	5.0
Isopropyl Alcohol	2.5
Amyl Acetate	1.0
Water	81.5

Blending Instructions:

Combine ingredients in the order shown and mix thoroughly.

Use Instructions:

Apply finished product to a towel or towellete (Kimwipe, etc.) and wipe onto the surface to be cleaned, then rinse. Alternatively, spray onto the surface to be cleaned, allow to set a few minutes, then rinse or hose off.

Product Information:	Benefit:
Witconol NP-100	Detergent and degreaser
Dowanol PM Glycol Ether	Solvent and coupling agent
Amyl Acetate	Solvent
Isopropyl Alcohol	Solvent
Formula 1001	

SOURCE: Witco Corp.: Suggested Formulations

Low Cost Extraction Carpet Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	91.0
Petro 22 Powder	5.0
EDTA Powder	4.0
Perfume	q.s.

Blending Procedure: Blend ingredients in the order listed.

Use Dilution: 1-2 oz/gal of water
Formula 901

Premium, Medium Duty Steam Extraction Carpet Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Tripolyphosphate, Light Density	65.0
Sodium Metasilicate, Pentahydrate	29.5
Petro 22 Powder	5.0
Optical Brightener	0.5

Blending Procedure: Blend ingredients in the order listed.

Use Dilution: 1-2 oz/gal
Formula 904

Heavy Duty Steam Extraction Carpet Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Carbonate (Soda Ash)	10.0
Trisodium Phosphate, Crystal	10.0
Sodium Metasilicate, Pentahydrate	20.0
Sodium Sulfate (Salt Cake)	56.0
Petro 22 Powder	4.0

Blending Procedure: Blend ingredients in the order listed.

Use Dilution: 1-2 oz/gal
Formula 905

SOURCE: Witco Corp.: Suggested Formulations

Low Foaming Carpet Extractor Detergent

<u>Component:</u>	<u>Wt%</u>
Sodium Bicarbonate	to 100% total
STPP	47.0
Burco LAF-6	2.5
Burco SZS	0.25
Burcosperse AP Powder	2.5
Burcotase SP-60 (if desired)	1.0
Fragrance	as desired

Procedure:

Spray LAF-6 (and if desired) fragrance onto STPP and blend until absorbed. Add Burco SZS, then Sodium Bicarbonate and blend until uniform. Add Burcosperse AP Powder (and if desired) Burcotase SP-60. Blend until uniform.

Use Concentration:

2-3 ounces per gallon in extractor.

SOURCE: Burlington Chemical Co., Inc.: Suggested Formulations

Rug Steam Cleaner
(Liquid)

Soil - Food (fat and protein), petroleum oil and grease, clay and particulate

Surface - Polyester and nylon

Application Method - Rug scrubber

Manufacture - Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	79.6
Metso Beads 2048	7.8
Sodium Xylene Sulfonate, 40%	8.7
C12-C15 Linear Alcohol, 12 Moles EO	3.9

Use Dilution: 4.7-9.4% bw (6-12 oz/gallon)

SOURCE: The PQ Corp.: Suggested Formulation

No Rinse Floor Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	79.0
Sodium Carbonate	4.0
Rewoteric AM B-14	10.0
Versene 100	2.0
Butyl Cellosolve	5.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Formula 932

Heavy Duty Floor Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	78.0
Varamide A-12	7.0
Trisodium Phosphate	10.0
Sodium Tripolyphosphate	5.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Solids: 22.0%

Formula 933

No-Rinse Floor Cleaner Degreaser

<u>Ingredients:</u>	<u>Wt%</u>
Deionized water	79.0
Sodium carbonate	4.0
Rewoteric AM V	10.0
Versene 100	2.0
Butyl Cellosolve	5.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Solids: 8.1%

pH: 10.9

Viscosity: 4 cps

Formula 951

SOURCE: Witco Corp.: Suggested Formulations

Wax Stripper (A)

<u>Ingredients:</u>	<u>Wt%</u>
Oleic Acid	7.0
Monoethanolamine	2.0
Avanel S-74	2.0
Potassium Hydroxide, 45%	1.0
Sodium Hydroxide, 50%	1.0
Versene 100	1.0
Dowanol TBA	5.0
Water	81.0

Procedure:

Add ingredients as listed.

Wax Stripper (B)

<u>Ingredients:</u>	<u>Wt%</u>
Oleic Acid	7.0
Monoethanolamine	2.0
Avanel S-74	2.0
Potassium Hydroxide, 45%	1.0
Sodium Hydroxide, 50%	1.0
Versene 100	1.0
Ethylene Glycol Monobutyl Ether	81.0
Water	5.0

Procedure:

Add ingredients as listed.

Concentrated Wax Stripper

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Hydroxide, 50%	6.5
Macol NP 9.5	1.0
EDTA, 40%	0.5
Mazox LDA	1.0
Barquat MB-50	1.0
Monoethanolamine	8.5
Water	81.5

Procedure:

Add ingredients as listed. To use, dilute 1:10 to 1:30.

Macol NP 10.5 can be substituted for the Macol NP 9.5. Mafo CB-40 can be substituted for the Mazox LDA.

SOURCE: PPG Industries, Inc.: Suggested Formulations

14. Miscellaneous

Bacteriostatic Concentrate w/Pine Oil

<u>Ingredients:</u>	<u>Wt%</u>
Phase I:	
Isopropanol	10.0
Oleic Acid	8.8
Varox 1770	5.0
Pine Oil	12.0
Phase II:	
Water, D.I.	62.2
Potassium Hydroxide (87%)	2.0
Blending Procedure:	
Combine Phase I ingredients and mix thoroughly. Combine Phase II ingredients and mix thoroughly. While mixing, add Phase I to Phase II.	
Typical Properties:	
Viscosity, cps: 5	
Solids: 10.6%	
pH: 9.3	
Formula 302	

General Disinfectant Solution

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	68.0
Varquat 50 MC	10.0
Glyoxal (40%)	5.0
Rewoteric AM DML-35	17.0
Blending Procedure:	
Add ingredients in order shown and dissolve completely between each addition.	
Typical Properties:	
Viscosity, cps: 4	
Solids: 13.0%	
pH: 7.1	
Formula 303	

Hospital Disinfectant

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	84.2
Variquat 50 MC	9.6
Varox 365	4.0
Versene 100	1.5
Sodium Hydroxide (30%)	0.7
Blending Procedure:	
Add ingredients in order shown and dissolve completely between each addition.	
Typical Properties:	
Viscosity, cps: 4	
Solids: 6.7%	
pH: 12.2	
Formula 304	

SOURCE: Witco Corp.: Suggested Formulations

Cutting Oil Concentrate

<u>Ingredients:</u>	<u>Weight%</u>
Aristonate M	36.00
Igepal CO-430	20.00
TEA, 85%	8.00
Oleic Acid	8.00
100 SUS Naphthenic Oil	28.00
Comments about this formula:	
1. Soluble Oil - Dilute 1:3 with 100 SUS naphthenic oil.	
2. Emulsion - Dilute 4:76 with 160 ppm hard water.	
Formulation SOL-003-01	

Cutting Oil

<u>Ingredients:</u>	<u>Weight%</u>
Aristonate M	10.50
TEA, 85%	0.90
Tall Oil Acid, Actinol FA-1	1.20
Calamide SM	1.65
100 SUS Naphthenic Oil	85.00
Water	0.75
Comments about this formula:	
Emulsion - Dilute 4:76 with 160 ppm hard water.	
Formulation SOL-004-01	

Concrete Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Calsoft F-90	5.00
Sodium Silicate	30.00
Sodium Carbonate	30.00
Sodium Hydroxide	25.00
Sodium Triphosphate	10.00
Comments about this formula:	
Grind mixture together to yield a slightly tacky white powder.	
Formulation CON-001-01	

White Wall Cleaner

<u>Ingredients:</u>	<u>Weight%</u>
Water	60.20
Calsoft L-40	29.30
Pilot SXS-40	2.20
Na4EDTA	1.30
Caloxylate N-9	7.00
Comments about this formula:	
Viscosity of the product is about 160 cPs at room temperature.	
Formulation TIR-001-01	

SOURCE: Pilot Chemical Co.: Suggested Formulations

d'Limonene Waterless Hand Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Phase I:	
Water, D.I.	81.0
Trisodium Phosphate	1.0
Sodium Citrate	2.0
Glycerin	2.0
Phase II:	
d-Limonene	7.0
DeSonic 9N	5.0
Varonic T202	2.0

Blending Procedure:

In vessel #1 combine Phase I ingredients and mix thoroughly. Heat to 140F. Combine Phase II ingredients in separate vessel and mix thoroughly. Heat to 140F. While mixing rapidly, add Phase II to Phase I. Cool quickly to stabilize emulsion.

Typical Properties:

Appearance, Room Temp.: Heavy Cream
 Solids: 12.0%
 pH: 10.4
 Formula 1120

Paste Hand Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	70.0
Varamide MA-1	10.0
Rewoteric AM B-15	10.0
Witcolate SE-5	10.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 6360
 Solids: 19.5%
 pH: 8.7
 Formula 1121

SOURCE: Witco Corp.: Suggested Formulations

Dipentene Microemulsion Formulations

Dipentene is described as a product of fractionation of pine oils containing related monocyclic terpene hydrocarbons, predominantly dipentene. (Structurally, dipentene is the same as limonene. D-limonene is one of the 2 optical isomers of dipentene.) Other components of commercial dipentene include carene and alpha- and beta- pinene.

Non-alkaline Formulations

<u>Ingredients:</u>	<u>Wt. %</u>
Dipentene 122	5.00
Tomah E-14-5	6.40
Tomah E-14-2	0.80
Tomah Alkali Surfactant	0.80
Water	87.00

CPL, C: 11

CPH, C: 38

Emulsifier/Dipentene Ratio: 1.60

<u>Ingredients:</u>	<u>Wt. %</u>
Dipentene 122	10.00
Tomah E-14-5	8.80
Tomah E-14-2	1.10
Tomah Alkali Surfactant	1.10
Water	79.00

CPL, C: 11

CPH, C: 50

Emulsifier/Dipentene Ratio: 1.10

<u>Ingredients:</u>	<u>Wt. %</u>
Dipentene 122	20.00
Tomah E-14-5	14.40
Tomah E-14-2	1.80
Tomah Alkali Surfactant	1.80
Water	62.00

CPL, C: 19

CPH, C: 41

Emulsifier/Dipentene Ratio: 0.90

Add and mix the first four ingredients (dipentene and emulsifiers). Dissolve the sodium metasilicate (if used) in the water and add it to the emulsifiers and dipentene with mixing.

CPL is "low temperature cloud point" while CPH is "high temperature cloud point".

SOURCE: Tomah Products, Inc.: Bulletin: Terpene Microemulsions

Dipentene Microemulsion Formulations(Continued)

Dipentene is described as a product of fractionation of pine oils containing related monocyclic terpene hydrocarbons, predominantly dipentene. (Structurally, dipentene is the same as limonene. D-limonene is one of the 2 optical isomers of dipentene.) Other components of commercial dipentene include carene and alpha- and beta- pinene.

Alkaline Formulations

<u>Ingredients:</u>	<u>Wt. %</u>
Dipentene 122	5.00
E-14-5	8.00
E-14-2	0.50
Alkali Surfactant	1.50
Water	83.30
Sodium Metasilicate Pentahydrate	1.70

CPL, C: 15
 CPH, C: 44
 Emulsifier/Dipentene Ratio: 2.00

<u>Ingredients:</u>	<u>Wt. %</u>
Dipentene 122	10.00
E-14-5	12.00
E-14-2	0.75
Alkali Surfactant	2.25
Water	73.50
Sodium Metasilicate Pentahydrate	1.50

CPL, C: 20
 CPH, C: 46
 Emulsifier/Dipentene Ratio: 1.50

<u>Ingredients:</u>	<u>Wt. %</u>
Dipentene 122	20.00
E-14-5	17.60
E-14-2	1.10
Alkali Surfactant	3.30
Water	56.80
Sodium Metasilicate Pentahydrate	1.20

CPL, C: 18
 CPH, C: 43
 Emulsifier/Dipentene Ratio: 1.10

Add and mix the first four ingredients (dipentene and emulsifiers). Dissolve the sodium metasilicate (if used) in the water and add it to the emulsifiers and dipentene with mixing.

CPL is "low temperature cloud point" while CPH is "high temperature cloud point".

SOURCE: Tomah Products, Inc.: Bulletin: Terpene Microemulsions

Hydrocarbon Solvent Microemulsions

Developed in order to offer replacements for expensive d-limonene and pine oil in microemulsion cleaners. They all have flash points above 100C and low VOC content.

Exxsol D-110 Formulations**Formula A:**

<u>Ingredients:</u>	<u>Wt. %</u>
Exxsol D-110	20.0
Tomah E-14-2	11.9
Tomah E-14-5	5.4
Tomah Alkali Surfactant	4.3
Soft Water	58.4

Formula B:

<u>Ingredients:</u>	<u>Wt. %</u>
Exxsol D-110	30.0
Tomah E-14-2	17.9
Tomah E-14-5	8.1
Tomah Alkali Surfactant	6.5
Soft Water	37.5

Formula C:

<u>Ingredients:</u>	<u>Wt. %</u>
Exxsol D-110	40.0
Tomah E-14-2	23.9
Tomah E-14-5	10.8
Tomah Alkali Surfactant	8.7
Soft Water	16.6

Add each component in the order given and mix until homogeneous before adding the next component. Add the water in portions with mixing.

These microemulsions should be clear and stable in the temperature range from 20-37C. Outside that range they may cloud or separate, but will regain clarity upon returning to room temperature. If it is necessary to raise the cloud point temperature, a small amount of additional Tomah Alkali Surfactant should be added.

SOURCE: Tomah Products, Inc.: Suggested Formulations

Hydrocarbon Solvent Microemulsions (Continued)

Developed in order to offer replacements for expensive d-limonene and pine oil in microemulsion cleaners. They all have flash points above 100C and low VOC content.

Isopar M Formulations

Isopar M can be substituted directly for the Exxsol D-110 in the above formulations. In addition, two formulations with lower solvent content have been developed.

Unbuilt:

<u>Component:</u>	<u>Wt.%</u>
Soft Water	83.0
Sodium Metasilicate Pentahydrate	0.0
Tomah E-14-2	4.7
Tomah E-14-5	4.7
Tomah Alkali Surfactant	1.6
Isopar M	6.0

Lightly built:

<u>Component:</u>	<u>Wt.%</u>
Soft Water	79.0
Sodium Metasilicate Pentahydrate	1.0
Tomah E-14-2	5.6
Tomah E-14-5	5.6
Tomah Alkali Surfactant	1.8
Isopar M	7.0

Start by dissolving the sodium metasilicate (if used) in the water. Then add the E-14-2, E-14-5, and Alkali Surfactant. Mix until homogeneous. Finally add the Isopar M in portions with mixing. The mixture will cloud, then should clear as the last of the Isopar M is added. These microemulsions will be clear and stable in the temperature range from 20-50C. The cloud point can be raised further by adding a small amount of additional Alkali Surfactant.

SOURCE: Tomah Products, Inc.: Suggested Formulations

Low Viscosity Silicone Emulsion Using Pemulen Resins

Silicone oil can be emulsified and stabilized via the use of Pemulen resins. The resins stabilize emulsions via electrostatic stabilization. This relieves the constraint of seeking an appropriate surfactant emulsifier.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	83.80
Pemulen 1622 (1)	0.20
Makon 10 (2)	0.70
Dow 200 Silicone Fluid (3)	15.00
Triethanolamine	0.30

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 1,000 cp

Product pH: 7.3

Product Clarity: Opaque

Raw Material Suppliers:

(1) BFGoodrich

(2) Stepan Co.

(3) Dow Corning

Procedure:

1. Use a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations. Screen the Pemulen resin into the vortex of the rapidly agitating water (800 rpm). Allow to mix until homogeneous and free of polymer lumps.
2. Add the Makon 10 and mix until homogeneous.
3. Add the silicone oil with vigorous agitation. Mix until uniform.
4. Add the TEA. Mix until smooth.

Total Actives:

Silicone Oil: 15.00%

SOURCE: BFGoodrich Specialty Chemicals: DET-510

Luminizing Pet Conditioner

Phospholipid EFA adds shine and a silky texture to the animal's coat or mane. The Monaquat TG provides body building conditioning and detangling while leaving a soft smooth feel. Monaquat ISIES is an effective long lasting antistat that controls dirt attraction.

<u>Ingredients:</u>	<u>Wt%</u>
Water	85.2
Hydroxyethyl Cellulose	0.8
Stearic acid	2.0
Stearyl alcohol	2.0
Monaquat TG	7.0
Monaquat ISIES (Isostearyl Ethylmidonium Ethosulfate)	0.5
Phospholipid EFA (Linoleamidopropyl PG-Dimonium Chloride Phosphate)	2.0
Sodium Chloride	0.5

Procedure:

Change water with agitation, sprinkle in hydroxyethyl cellulose and turn heat on. At 50-60C add stearic acid, stearyl alcohol, Monaquat TG, Monaquat ISIES, Phospholipid EFA, and sodium chloride. Heat and mix to 70-75C (a smooth creme). Cool to 40C. Adjust pH to 4.5-5.0. Add color, fragrance and preservative. Package.

Typical Properties:

Appearance: Opaque viscous lotion

Recommended Use Dilution: As is

Formulation F-777

Pet Shampoo

A high foaming, mild detergent which will leave your pet fresh and clean.

<u>Ingredients:</u>	<u>Wt%</u>
Water	70.0
Monatarge 779	25.0
d-Limonene	5.0

Procedure:

Add ingredients in the order listed with agitation. Adjust pH to 7.0. Add color and preservative. Package.

Typical Properties:

Appearance: Clear yellow liquid

Recommended Use Dilution: 1:50 with water

Formulation F-774

SOURCE: Mona Industries, Inc.: Suggested Formulations

Micro-Emulsions with d-Limonene

The following concentrates are clear, micro-emulsions of limonene and water. These formulas are generally used by diluting in water are very effective for removing many oily and resinous soils. The formula themselves are clear and exhibit a bloom effect upon dilution.

Formula I

<u>Ingredients:</u>	<u>Wt%</u>
d-Limonene	10.0
Monamulse dL-1273	18.0
Water	62.0

Formula II

<u>Ingredients:</u>	<u>Wt%</u>
d-Limonene	35.0
Monamulse dL-1273	28.0
Isopropanol	5.0
Water	32.0

Formula III

<u>Ingredients:</u>	<u>Wt%</u>
d-Limonene	65.0
Monamulse dL-1273	23.0
Water	12.0

Procedure:

In all cases, mix surfactant with d-Limonene until dissolved. Add other ingredients except water. Mix until homogeneous. Add water slowly with stirring.

Recommended Use Dilution: 1:10 with water

SOURCE: Mona Industries, Inc.: Formulation F-786

Micro-Emulsions with Pine Oil

The following formulas are clear microemulsions of pine oil and water. They represent the range of pine oil and water concentrations commonly used. The formulas themselves are clear and exhibit a bloom effect upon dilution.

Formula 1

<u>Ingredients:</u>	<u>Wt%</u>
Pine Oil	35.0
Monamulse TRP	20.0
Water	45.0
Appearance: Clear	
Dilution (1% in tap water): Blooms	

Formula 2

<u>Ingredients:</u>	<u>Wt%</u>
Pine Oil	20.0
Monamulse TRP	20.0
Isopropanol	5.0
Water	55.0
Appearance: Clear	
Dilution (1% in tap water): Blooms	

Formula 3

<u>Ingredients:</u>	<u>Wt%</u>
Pine Oil	9.0
Monamulse TRP	10.0
Isopropanol	10.0
Water	71.0
Appearance: Clear	
Dilution (1% in tap water): Blooms	

Formula 4

<u>Ingredients:</u>	<u>Wt%</u>
Pine Oil	2.0
Monamulse TRP	5.0
Water	93.0
Appearance: Clear	
Dilution (1% in tap water): Clear	

Procedure:

Blend ingredients in the order listed with agitation. Package.

Recommended Use Dilution: 1:10 with water

Formula F-785

SOURCE: Mona Industries, Inc.: Suggested Formulations

Plastic Bottle Wash
Stable in hard water

<u>Ingredients:</u>	<u>Wt%</u>
Water	26.5
KOH-45%	19.5
Kasil #1	39.0
STPP	8.0
Burco HCS-50NF	7.0

% Solids: 31.0

Add components in order listed. Blend between additions.

To formulate a lower activity product, keep the ratio of the components the same, so that the balance of the formulation is not destroyed. End use concentrations will depend on degree of soil to be removed. Normally, a 2% end use concentration is sufficient for bottle cleaning.

A slight silicate precipitate may occur upon long standing.

Bottle Wash Formulations
Low Foam

<u>Ingredients:</u>	<u>Wt%</u>
50% NaOH	To 100% Total
Burco BSGH-270	2.5-5.0%
Burco HCS-50NF	0.5-2.5%

Add BSGH-270 and HCS-50 NF to 50% NaOH.

Moderate Foam

<u>Ingredients:</u>	<u>Wt%</u>
50% NaOH	To 100% Total
Burco BSGH-270	2.5-5.0%
Burco NPS-225	0.5-2.5%
Water	3.0-7.5%

It is recommended that the BSGH-270 and NPS-225 be dissolved in an equal amount of water and the caustic added to that premix. To defoam this formulation use a 3/1 ratio of NPS-225/Burco LAF-125.

SOURCE: Burlington Chemical Co., Inc.: Suggested Formulations

Terpene Microemulsions

The formulations given here will produce clear stable micro-emulsions containing from 15% to 40% d-limonene.

Glidsol 180 (from SCM Glidco Organics Corp.), a pine oil derivative can be substituted for d-limonene in the formulations to give a flash point above 140F. Note that other pine oils may not work in these formulations.

Formula A:	<u>Wt. %</u>
D-Limonene	40.0
Tomah E-14-5	22.4
Tomah E-14-2	2.8
Tomah Alkali Surfactant	2.8
Water	32.0

% total surfactant: 28.0%

Emulsifier/Terpene ratio: 0.700

Formula B:	<u>Wt. %</u>
D-Limonene	30.0
Tomah E-14-5	19.2
Tomah E-14-2	2.4
Tomah Alkali Surfactant	2.4
Water	46.0

% total surfactant: 24.0%

Emulsifier/Terpene ratio: 0.800

Formula C:	<u>Wt. %</u>
D-Limonene	20.0
Tomah E-14-5	12.8
Tomah E-14-2	1.6
Tomah Alkali Surfactant	1.6
Water	64.0

% total surfactant: 16.0%

Emulsifier/Terpene ratio: 0.800

Formula D:	<u>Wt. %</u>
D-Limonene	15.0
Tomah E-14-5	12.0
Tomah E-14-2	1.5
Tomah Alkali Surfactant	1.5
Water	70.0

% total surfactant: 15.0%

Emulsifier/Terpene ratio: 1.000

Add each component in the order given and mix until homogeneous before adding the next component. Add the water in portions with mixing.

A typical use level would be at 10/1 to 40/1 with water. About 1-2% d-limonene at use level is usually sufficient. Heavy grease would require a higher concentration of d-limonene.

Concentrated Formula

Formula:	<u>Wt. %</u>
D-Limonene	70.0
Tomah E-14-5	14.0
Monamid 705	4.0
Tall Oil Fatty Acid	1.6
Monoethanolamine	0.4
Water	10.0

SOURCE: Tomah Products, Inc.: Bulletin: Terpene Microemulsions

Wax Emulsion Using Pemulen Resins

This wax emulsion can be created and stabilized via the use of Pemulen resins. The resins stabilize emulsions via electrostatic stabilization. This relieves the constraint of selecting an appropriate surfactant emulsifier.

<u>Ingredient:</u>	<u>Wt%</u>
Bareco C-36 Wax (1)	12.00
Hoechst Wax E (2)	8.00
Pemulen 1622 (3)	0.30
DI Water	79.50
Morpholine	0.20

Physical Properties:

Product Clarity: Opaque

Raw Material Suppliers:

- (1) Petrolite Corp.
- (2) American Hoechst Corp.
- (3) BFGoodrich

Procedure:

1. Melt the waxes together in a vessel, approximately at 90C.
2. Use a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations. Screen the Pemulen resin into the vortex of the rapidly agitating water (800 rpm). Allow to mix until homogeneous and free of polymer lumps.
3. Heat the Pemulen dispersion to 90C. Add the Pemulen dispersion to the melted wax with vigorous agitation.
4. Add the morpholine and cool quickly.

Total Actives:

Total Wax: 20.00%

SOURCE: BFGoodrich Specialty Chemicals: DET-501

Section II

Transportation Cleaners and Polishes

15. Auto Cleaners and Polishes

Chrome Polish

In addition to thickening, Carbopol resins impart yield value allowing particles, such as abrasives, to become permanently suspended. The resin also prevents "creaming" or phase separation by suspending and separating the oil droplets.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	39.25
Morpholine	1.39
Pumice	14.00
Snow Floss	9.25
SF96 Silicone Fluid (350) (1)	1.85
Yarmor 302 Pine Oil (2)	0.46
Oleic Acid	1.85
Mineral Spirits	24.50
TEA lauryl sulfate (3)	2.30
Cocamide DEA (4)	0.50
DI Water	4.46
Carbopol EZ-2 (5)	0.19

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 10,800 cp
 Product pH: 9.0
 Product Clarity: Opaque

Raw Material Suppliers:

- (1) General Electric
- (2) Hercules
- (3) Rhone-Poulenc
- (4) Henkel: Standamid PD
- (5) BFGoodrich

Procedure:

1. Dissolve the morpholine in the water.
2. With rapid agitation, add the pumice and Snow Floss.
3. Dissolve the silicone oil, pine oil, and oleic acid in the mineral spirits. Slowly add into the above mixture with rapid agitation.
4. Add in the TEA lauryl sulfate and Standamid PD. Blend thoroughly.
5. In a separate vessel, disperse 0.19 parts of Carbopol into 4.46 parts of water by simply "dumping" the polymer into the water. In just a few minutes, the polymer will completely wet out. Add this dispersion to the above mixture. Blend thoroughly.

Total Actives:

Silicone Fluid: 1.85
 Total Surfactant: 4.65
 Mineral Spirits: 24.50
 Total Abrasives: 23.25

SOURCE: BFGoodrich Specialty Chemicals: DET-551

Liquid Car Polish

In addition to thickening, Carbopol resins impart yield value allowing particles, such as abrasives, to become permanently suspended. The resin also prevents "creaming" or phase separation by suspending and separating the oil droplets.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	37.80
Triethanolamine	0.20
Wax Emulsion (1)	2.50
Morpholine	2.00
SF96 Silicone Fluid (350) (2)	1.50
Oleic Acid	2.50
Kerosene	10.00
Mineral Spirits	6.00
DI Water	19.70
Carbopol EZ-2 (3)	0.30
Isopropanol	0.40
Mineral Spirits	5.00
SF1706 Reactive Amine Polymer (4)	1.50
SF1705 Reactive Amine Polymer (4)	2.10
Kaopolite kaolin clay (5)	8.50

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 3,200 cps

Product pH: 8-9

Product Clarity: Opaque

Raw Material Suppliers:

(1) see BFGoodrich Literature DET-501

(2) General Electric

(3) BFGoodrich

(4) General Electric

(5) Kaopolite, Inc.

Procedure:

1. Mix together the water, TEA, wax emulsion, and the morpholine.
2. In a separate vessel, mix the silicone fluid, oleic acid, kerosene and the mineral spirits together. Add this to the above mixture with vigorous agitation.
3. In a separate vessel, disperse 0.30 parts of Carbopol into 19.70 parts of water by simply "dumping" it in. The polymer will wet out in a few minutes. Add this dispersion to the above mixture. Mix until homogeneous.
4. In a separate vessel, mix the isopropanol, mineral spirits, and the two reactive amine polymers together. Add to the above mixture. Mix until homogeneous.
5. Slowly add in the clay. Mix until homogeneous.

Total Actives:

Total Wax:	0.50
Silicone Fluid:	1.50
Mineral Spirits:	11.00
Reactive Amine Polymer:	3.60
Abrasive:	8.50

SOURCE: BFGoodrich Specialty Chemicals: DET-500

Liquid Spray Cleaner for Aluminum Trucks

<u>Ingredients:</u>	<u>Wt%</u>
Water	50.0
Phosphoric Acid, 75%	20.0
Citric Acid	10.0
Macol 48	4.0
Ammonium Bifluoride	3.0
Avanel S-30	3.0

Procedure:

Add ingredients in order as listed. Dilute one part cleaner with five parts water to use.

Aluminum Cleaner/Brightener

<u>Ingredient:</u>	<u>Wt%</u>
Phosphoric Acid, 85%	6.0
Citric Acid, 50%	8.0
Nitric Acid, 70%	1.0
Avanel S-70	2.0
Water	83.0

Procedure:

Charge the water to the mixing vessel. Under slow agitation and with due care, add the acids to the water. Add the Avanel S-70 and mix for 10 minutes. Note: If additional brightening is required, the nitric acid may be increased to 1.5%.

Formulation CM-101

Non-Phosphorous Aluminum Cleaner

<u>Ingredient:</u>	<u>Wt%</u>
Citric Acid, 50%	12.0
Gluconic Acid, 50%	8.0
Avanel S-70	3.0
Water, Dye	77.0

Procedure:

Charge the water, citric acid, gluconic acid and Avanel S-70 to the mixing vessel. Mix well. If dye is to be added, part of the water should be held out. Add the dye to the water with good agitation and then add the water to the batch.

Formulation CM-102

SOURCE: PPG Industries, Inc.: Suggested Formulations

Mild Abrasive Automobile Polish

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
Masil SF 1,000	4.0
Oleic Acid	2.0
Carnauba Wax #1 Yellow	6.0
Isopar M	14.5
Mazamide SS-10	0.75
Part B:	
Isopar M	12.0
Masil 123	2.0
Part C:	
Isopar M	2.5
Morpholine	1.1
Part D:	
Water	45.15
Kaopolite SF	10.0

pH (as is): 7.5-8.5

Appearance: Cream-Colored Paste

Procedure:

1. Charge the components in Part A to a steam-heated mixing vessel equipped with agitation. Start agitation and heat to 90C.
2. In separate vessels, charge Part B and Part C components. When Part A reaches 90C and all the wax has melted, add Part B to the vessel followed by Part C. Apply cooling.
3. In a separate vessel, prepare Part D by adding the Kaopolite SF to the water under agitation. Add Part D to Part A and continue cooling. NOTE: The finished product is a paste. A stiffer paste can be prepared by increasing the oleic acid charge.

SOURCE: PPG Industries, Inc.: Formulation SA-101

16. Car and Truck Wash Compounds

Car Shampoo Concentrate

This formulation produces copious amounts of foam while cleaning automotive finishes. It is mild to both the user and the automotive finish.

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
Deionized Water	30.0
Sodium Citrate	0.5
Part B:	
Mafo CSB-50	5.0
Witconate 60 T Liquid	7.5
Macol TD-12	4.0
Triethanolamine, 85%	1.0
Deionized Water	52.0
pH (as is): 8.0-9.0	
Appearance: Clear, light-yellow liquid	
Specific Gravity: 1.00	

Procedure:

1. Charge the first portion of water to a mixing vessel and dissolve the sodium citrate in it.
2. Add the remaining ingredients in the order listed. Stop agitation and permit the product to deaerate prior to filling off. NOTE: Use concentration is 1-2 ounces per gallon of warm water.

Automatic Car Wash Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Deionized Water	50.0
Maphos 60-A	6.0
Potassium Hydroxide	3.0
Tetrapotassium Pyrophosphate	2.0
Sodium Metasilicate, Anhydrous	2.0
Macol LF 120	2.0
Mazamide 80	2.0
Sodium Xylene Sulfonate, 40%	3.0
Macol 48	3.0
Deionized Water	27.0
pH (as is): 12.5-13.5	
Appearance: Clear, light-yellow liquid	
Specific Gravity: 1.06	

Procedure:

Charge the first portion of water to the mixing vessel and start agitation. Add the ingredients in the order listed and mix until clear. NOTE: This is a highly alkaline cleaner designed to be used in commercial automatic car washes at a dilution rate of 1-2 ounces per gallon. Do not use directly on automotive finishes
Formulation CA-102

SOURCE: PPG Industries, Inc.: Suggested Formulations

Car Wash (Calsoft LAS-99-Based)

<u>Ingredients:</u>	<u>Weight%</u>
Water	72.50
NaOH, 50%	2.40
Diethanolamine	0.50
Calsoft LAS-99	10.10
Calamide C	3.70
Pilot SXS-40	7.00
Calfoam EA-603	2.80
Ammonium Chloride	1.00
Comments about this formula:	
Add ingredients in order listed.	
Formulation CWC-008-01	

Car Wash (Calsoft LAS-99-Based)

<u>Ingredients:</u>	<u>Weight%</u>
Water	59.80
NaOH, 50%	4.35
Calsoft LAS-99	16.30
Calamide C	2.05
Pilot SXS-40	12.50
Calfoam EA-603	3.00
Caloxylate N-9	2.00
Comments about this formula:	
Add ingredients in order listed.	
Formulation CWC-007-01	

Car Wash (Calsuds A-Based)

<u>Ingredients:</u>	<u>Weight%</u>
Water	64.20
Calsuds A	28.00
Calfoam EA-603	2.80
Calsuds CD-6	4.00
Ammonium Chloride	1.00
Comments about this formula:	
Add ingredients in order listed.	
Formulation CWC-006-01	

Car Wash (Calsoft T-60-Based)

<u>Ingredients:</u>	<u>Weight%</u>
Water	70.00
Calsoft T-60	20.00
Pilot SXS-40	5.00
Caloxylate N-9	5.00
Comments about this formula:	
Add ingredients in order listed.	
Formulation CWC-005-01	

SOURCE: Pilot Chemical Co.: Suggested Formulations

Car Wash

Readily removes a wide variety of road soils.

<u>Ingredients:</u>	<u>Wt%</u>
Water	70.0
Monaterge ALX-100S (Cocamide DEA (and) DEA Dodecyl-benzenesulfonate (and) Diethanolamine)	30.0

Procedure:

Add ingredients in the order listed with agitation. Adjust pH to 7.0. Add color, fragrance and preservative. Package.

Typical Properties:

Appearance: Clear yellow liquid

Recommended Use Dilution: 1:20 with water.

Formulation F-772

Paste Car Wax

This easily applied automobile paste wax formula will provide improved cleaning, depth of gloss, lasting beauty and shine to new and older automobile finishes. Monasil PCA will provide shine and detergent resistance to any paste wax formula.

<u>Ingredients:</u>	<u>Wt%</u>
Part I:	
Monasil PCA	4.5
Dimethicone (12,500 cst)	2.0
Carnauba Wax #1 Yellow	6.0
Tall Oil Fatty Acid	3.0
Isopar K	24.0
Kaopolite 1152	10.0
Part II:	
Water	50.0
TEA (99%)	0.5

Procedure:

Prepare each phase separately, heat to 70C. Add Part II slowly to Part I with good agitation. Stir cool to 40-50C and package.

Formulation F-826

SOURCE: Mona Industries, Inc.: Suggested Formulations

Car Wash w/Amphoteric

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	55.0
Sodium Tripolyphosphate	4.0
Rewoteric AM B-14	10.0
Varonic DM-55	2.0
Sodium Hydroxide, 30%	9.0
Witco 1298SA	20.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 290

Solids: 29.5%

pH: 8.9

Formula 630

Windshield Washer Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	56.0
Isopropanol	30.0
Petro BAF Powder	1.0
DeSophos 5AP	0.5
EDTA, 38%	2.5

Blending Procedure: Blend ingredients in the order listed.

Use "as is" in winter; dilute up to 29:1 for summer use.

Formula 666

Windshield Washer Formulation

<u>Ingredients:</u>	<u>Wt%</u>
Witconate 1240	1.0
Isopropanol	39.0
Water	60.0

Blending Procedure:

Dissolve Witconate 1240 in water, then add isopropanol.
Formula 667

SOURCE: Witco Corp.: Suggested Formulations

Car Wash Concentrate w/Alcohol Ethoxylate

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	64.9
Witcolate SE-5	8.3
Witconate 1260 Slurry	16.7
Petro LBA Liquid	1.3
DeSonic 81-6	5.0
Witcamide 128T	3.8

Blending Procedure: Blend ingredients in the order listed.

Typical Properties:

Viscosity, cps: 210

Actives, %: 23.7

Formula 611

Car Wash Concentrate w/Alcohol Ethoxylate

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	43.3
Witcolate SE-5	13.9
Witconate 1260 Slurry	27.8
Petro LBA Liquid	5.0
DeSonic 81-6	7.0
Witcamide 128T	3.0

Blending Procedure: Blend ingredients in the order listed.

Typical Properties:

Viscosity, cps: 335

Actives, %: 37.5

Formula 611

Car Wash Concentrate w/Alcohol Ethoxylate

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	36.0
Witcolate SE-5	15.0
Witconate 1260 Slurry	30.0
Petro LBA Liquid	6.0
DeSonic 81-6	8.0
Witcamide 128T	5.0

Blending Procedure: Blend ingredients in the order listed.

Typical Properties:

Viscosity, cps: 315

Actives, %: 43.0

Formula 611

SOURCE: Witco Corp.: Suggested Formulations

Car and Truck Wash Formula

<u>Ingredients:</u>	<u>Weight%</u>
Calfax DB-45	19.83
Calsoft L-40	24.95
Trisodium Phosphate	10.02
Water	45.18

Comments about this formula:

Add ingredients in order listed.

Formulation CWC-001-01

Car and Truck Wash Formula

<u>Ingredients:</u>	<u>Weight%</u>
Calfax DB-45	20.00
Calsoft L-40	25.17
Disodium Phosphate	10.04
Water	44.76

Comments about this formula:

1. This is lower pH formula then CWC-001-01.

2. Heating is necessary to homogenize.

Formulation CWC-002-01

Car Wash (Powder)

<u>Ingredients:</u>	<u>Weight%</u>
Sodium Tripolyphosphate	85.00
Calsoft F-90	5.00
Caloxylate N-9	10.00

Comments about this formula:

Add ingredients in order listed.

Formulation CWC-003-01

Car Wash (Calsuds A-Based)

<u>Ingredients:</u>	<u>Weight%</u>
Calsuds A	50.00
Calfoam EA-603	3.00
Caloxylate N-9	2.00
Water	45.00

Comments about this formula:

Add ingredients in order listed.

Formulation CWC-004-01

SOURCE: Pilot Chemical Co.: Suggested Formulations

Car Wash and Care

Car Shampoo with Water-Repellent Effect

<u>Ingredients:</u>	<u>Wt%</u>
Autopur WK 4332	45.0
Amphotensid B 4	5.0
Water	50.0
Formula CT 04-03-02	

Rinse-off Agent (Water-Repellent)

<u>Ingredients:</u>	<u>Wt%</u>
Autopoon GK 4004	17.0
Mulsifan RT 1	6.0
Produkt 2058	6.0
Pine oil	3.0
Butyl diglycol	8.0
Water	60.0
Formula CT 04-05-07	

Rinse-off Agent (Water-Repellent) Without Hydrocarbons

<u>Ingredients:</u>	<u>Wt%</u>
Autopoon GK 4008	17.0
Mulsifan RT 1	6.0
Produkt 2058	6.0
Butyl diglycol	8.0
Water	63.0
Formula CT 04-05-03	

Windshield-Cleaner (Summer)

<u>Ingredients:</u>	<u>Wt%</u>
Water	67.9
Ethanol	20.0
Zusolat 1005/85	5.2
Zusolat 1008/85	6.9
Formula CT 04-06-01	

<u>Ingredients:</u>	<u>Wt%</u>
Water	23.7
Zeteson NL	64.0
Zusolat 1008/85	1.3
Isopropanol	11.0
Formula CT 04-06-04	

SOURCE: Zschimmer & Schwarz GmbH & Co.: Suggested Formulations

Car Wash and CareWindshield-Cleaner (Winter)

<u>Ingredients:</u>	<u>Wt%</u>
Water	29.5
Isopropanol	70.0
Zetesol 2056	0.5
Formula CT 04-06-07	

Insect Remover

<u>Ingredients:</u>	<u>Wt%</u>
Sulfetal 4105	4.0
Zusolat 1008/85	2.0
Phosfetal 201	2.0
Trilon A liquid	4.0
Monoethanolamine	4.0
Butyl diglycol	5.0
Water	79.0
Formula CT 04-07-01	

Wheel Cleaner, Alkaline

<u>Ingredients:</u>	<u>Wt%</u>
Water	77.5
Tetrapotassium pyrophosphate	3.0
Lumoro1 4192	10.0
Zusolat 1005/85	4.0
Butyl diglycol	5.0
Orange terpene	0.5
Formula CT 04-11-04	

Tar Remover

<u>Ingredients:</u>	<u>Wt%</u>
Mulsifan K 326 Spezial	15.0
White-spirit	60.0
n-butanol	7.0
Oleic acid	3.0
Water	15.0
Formula CT 04-13-02	

SOURCE: Zschimmer & Schwarz GmbH & Co.: General Formulations

Car Wax

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
Morpholine	0.8
Water	44.2
Part B:	
Wax S	8.0
Oleic Acid	1.0
Mineral Spirits	18.0
Kerosene	9.0
Part C:	
Masil EM 250 C	10.0
Masil EM 10,000 C	3.0
Snow Floss	3.0
Kaopolite SF	3.0
Carbopol 941 (1% in water)	As needed

Procedure:

1. Add the morpholine to the water with high speed mixing.
2. In Part B, add the oleic acid, mineral spirits, kerosene, and Wax S with high speed mixing. Add Part B to Part A with high shear mixing.
3. Add the Masil EM 250 C and Masil EM 10,000 C from Part C to the concentrate with slow mixing. Add the Snow Floss and Kaopolite SF. Thicken with the Carbopol 941 solution.

Auto Wipe & Shine Polish

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
Masil SF 100	3.5
A-C 617A	2.0
Oleic Acid	1.5
Mineral Oil, 70 SUS	5.6
Part B:	
Morpholine	1.4
Carbopol 934	0.2
Triethanolamine	0.2
Water	85.6

Procedure:

1. Add the ingredients in Part A as listed and heat to 90C.
2. For Part B, heat the water to 85C. Disperse the Carbopol 934 in the water. When completely dissolved, add the triethanolamine. Then, add the morpholine.
3. Add Part A to Part B and blend.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Concentrated Traffic Film Removers

Two formulations were developed which contain 50% total water, including the water in the sodium metasilicate pentahydrate. One contains nonionic, the other has no nonionic but has more AO-14-2 and Alkali Surfactant, the combination of which should do as well as the nonionic for hard surface cleaning.

Mix in the order given:

Formula 1:

<u>Component:</u>	<u>Wt%</u>
Water	22.00
Versene 100	38.00
Sodium Metasilicate Pentahydrate	8.00
Tomah Alkali Surfactant	16.00
Tomah AO-14-2	8.00
Tomah Q-17-2	8.00

% anhydrous builder: 19.00

Surfactant/builder ratio: 1.68

Mix in the order given:

Formula 2:

<u>Component:</u>	<u>Wt. %</u>
Water	36.20
Versene 100	19.70
Sodium Metasilicate Pentahydrate	4.10
Tomah Alkali Surfactant	10.00
Tomah AO-14-2	10.00
Tomah Q-17-5	10.00
Nonionic NP-9.5	10.00

% anhydrous builder: 9.82%

Surfactant/builder ratio: 4.07

Note that sodium metasilicate pentahydrate is actually about 57% sodium metasilicate on an anhydrous basis. Versene 100 is about 38% tetrasodium EDTA on an anhydrous basis. Thus these formulations are about 50% total water when calculated on an anhydrous builder basis. The surfactants were considered on an as-is basis, and not corrected for the water content. Anhydrous sodium metasilicate and anhydrous tetrasodium EDTA are readily available; anhydrous amphoterics and amine oxides are not.

These formulations were made up and found to be freeze-thaw stable.

Formula 1 was diluted 1/20 with water to 2.5% actives, and tested by spraying on a dirty car. It was compared with Formula T-107 Traffic Film Remover also at 2.5% actives. No significant differences were seen, so the absence of nonionic did not adversely affect the performance of the concentrated formulation.

SOURCE: Tomah Products, Inc.: Suggested Formulations

Foamy Brush Car Wash, Liquid

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.*	79.75
Caustic Soda, 50%	1.40
Witco 1298SA	5.00
Witcolate SE-5	7.00
Petro BAF Liquid	3.00
Witcamide 128T	3.00
Formalin	0.10
Sodium Chloride	0.75

Blending Procedure:

Blend ingredients in the order listed. Sodium Chloride is used to adjust viscosity of the product.

Typical Properties:

Specific Gravity: 1.015
Wt./Gal. lbs.: 8.46
pH, as is: 9.8
Viscosity, cps: 410

Dilution Ratio at Wand=1:40

*If unsoftened tap water is used, add 0.25% liquid EDTA, 40% to counteract hardness.

Formula 621

Low Cost Car Wash

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	89.9
Petro LBA Powder	1.0
Witcolate SE-5	6.0
Witcamide 128T	3.0
Formalin	0.1
Sodium Chloride	q.s.
Perfume, Dye	q.s.

Blending Procedure:

Blend the ingredients in the order listed. Adjust the pH=7.5-8.0. The Sodium Chloride is used to adjust the viscosity of the final product.

Formula 609

SOURCE: Witco Corp.: Suggested Formulations

General Purpose Car Wash

This is a copious-foaming, all-purpose car wash formulated to be safe on car finishes, yet effective in the removal of road grime and other soils.

<u>Ingredient:</u>	<u>Wt%</u>
Deionized Water	50.0
Mazon 98	9.5
Macol TD-3	1.5
Witcolate WACLA	2.5
Mazamide 80	3.0
Macol 48	1.0
Triethanolamine, 85%	1.5
Deionized Water	31.0

pH (as is): 8.5-9.5

Appearance: Clear, light-yellow liquid

Specific Gravity: 1.02

Procedure:

Charge the first portion of water to a mixing vessel and start slow agitation (excessive agitation will produce a foaming problem). Add the remaining ingredients in the order listed and mix until clear. NOTE: Use concentration is 1-2 ounces per gallon of warm water.

Formulation CA-103

Liquid Car Wash

<u>Ingredient:</u>	<u>Wt%</u>
Water	34.0
Witconate 60 T Liquid	30.0
Macol OP-10 SP	10.0
Mazamide 80	6.0
Hexyl Carbitol	10.0
Methanol	10.0

Procedure:

Add ingredients in order as listed.

Boat Wash & Car Cleaner

<u>Ingredient:</u>	<u>Wt%</u>
Water	39.0
Mazamide 80	11.0
Macol NP 9.5	5.0
Witconate 60 T Liquid	45.0

Procedure:

Add ingredients in order as listed.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Heavy Duty Truck Wash, Liquid

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	70.0
Trisodium Phosphate, Crystal	2.0
Caustic Soda Beads	2.0
Witco 1298 Soft Acid	10.0
Petro BAF Liquid	3.0
Sodium Silicate 40 Be' (Star)	3.0
Witcolate SE-5	3.0
Ethylene Glycol Monobutyl Ether (EB)	3.0
Emcol 6744	4.0

Blending Procedure:
Blend ingredients in order listed.

Typical Properties:
Specific Gravity: 1.042
Wt./Gal. lbs.: 8.69
pH, as is: 12.7

Dilution Rate: Dilute 1:40 at Wand
Formula 603

Heavy Duty Truck Wash, Powder

<u>Ingredients:</u>	<u>Wt%</u>
Sodium Carbonate (Soda Ash), Light Density	17.25
Sodium Tripolyphosphate, Light Density	55.00
DeSophs 5AP	2.90
DeSonic 9N	7.50
Sodium Metasilicate, Anhydrous	5.00
Sodium Sulfate (Salt Cake)	10.00
Caustic Soda Beads	2.30
Dye*	0.05

Blending Procedure:
Premix Soda Ash and Tripoly together and slowly add DeSophs 5AP while mixing. Mix until product is uniform in appearance. Add DeSonic 9N while mixing. Mix until the product looks dry (4-5 minutes). Add Metasilicate, Salt Cake and then Caustic Soda beads.

*If dye is used, mix with the DeSonic 9N.
Formula 604

SOURCE: Witco Corp.: Suggested Formulations

Premium Car Wash Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	11.7
Ethanol	5.9
Varox 1770	17.6
Witconate AOS Liquid	46.8
Witcolate SE-5	17.6

Blending Procedure:

Add all ingredients except Witcolate SE-5, in order shown and dissolve completely between each addition. Add Witcolate SE-5 last in small aliquots allowing complete dissolution between additions.

Typical Properties:

Viscosity, cps: 160
Solids: 35.4%
pH: 8.4

Formula 629

Car Wash

<u>Ingredients:</u>	<u>Wt%</u>
Water	91.67
Tetrapotassium Pyrophosphate, 60%	3.33
Witcamide 6445	5.00

Blending Procedure: Blend ingredients in order listed.

Typical Properties:

Viscosity, cps: 2100
Solids: 6.8%
pH, as is: 9.3

Formula 615

Auto Shampoo Concentrate

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	80.0
Rewoteric AM KSF-40	15.0
Witcolate SE-5	5.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 4.0
Solids: 9.0%
pH: 9.5

Formula 628

SOURCE: Witco Corp.: Suggested Formulations

Touchless Vehicle Wash Detergent
(Zero Phosphate, Powder)

Soil-Grease, oil, salt, water deposits, clay, particulates,
road film

Surface-Painted metal surface, Polymeric

Application Method-High pressure spray (700-1400 psi)

Manufacture-Dry Blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Carbonate	25-30
Metso Beads 2048	20-25
*Sodium Polyacrylate (92% solids)	1.0- 3.0
Surfactant	5-10
Turbobrite Aluminosilicate	25-35
Fillers	Balance

Dilution: 1.0-2.0% by weight (0.1-0.2 pounds/gallon)

Add 0.1-0.2 pounds of detergent per gallon of water output to the spray nozzle. Mix powder detergent in tank and meter into car wash system. Mild abrasive cleaning and polishing effect of Turbobrite is extremely effective in high pressure spray wash systems for removing oil and water deposits, particulate soils, and haze from body parts and windshields.

Constant agitation in tank is necessary to keep Turbobrite suspended.

Vehicle Wash Detergent (Low pH)
(Zero Phosphate, Powder)

Soil-Grease, oil, salt, water deposits, clay, particulates,
road film.

Surface-Painted metal surface, Polymeric

Application Method-High pressure spray (700-1400 psi)

Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Sodium Carbonate	27.9
Britesil H2O Hydrous Sodium Polysilicate	21.0
*Acusol 445ND Sodium Polyacrylate (92% solids)	3.0
**Liquid Nonionic Surfactant	12.0
Valfor 100 Zeolite A	36.1

*Dilution: 1.5% by weight (0.125 pounds/gallon)

Add 0.125 pounds of detergent per gallon of water output to the spray nozzle. Dissolve powder detergent in tank and meter into car wash system. Mild abrasive cleaning and polishing effect of Valfor 100 is extremely effective in high pressure spray wash systems for removing oil and water deposits, particulate soils, and haze from body parts and windshields.

Constant agitation in tank is necessary to keep Valfor 100 suspended in solution.

* Rohm & Haas

** Low Foam: Rhone-Poulenc Antarox BL-330 (3 moles EO)

High Foam: Shell Chemical Neodol 23-6.5 or Neodol 25-7

SOURCE: PQ Corp.: Detergent Formulation Guide

Truck/Bus Wash

<u>Components:</u>	<u>% by Weight</u>
Burco TME	7
Burcosolv TM	5
Neodol 91-6	20
TEA 85%	5
Burcene 100	2
Water	Balance

Dilute 50:1 to 100:1 depending on degree of soil to be removed

Economy Truck/Bus Wash

<u>Components:</u>	<u>% by Weight</u>
Water	76
Burco TME	5
Neodol 1.5	2
Citric Acid Liquid 50%	5
KOH, 45%	5
Ammonyx LO	5
TEA 85%	2

Dilute 20:1 to 50:1 depending on degree of soil to be removed.

SOURCE: Burlington Chemical Co., Inc.: Suggested Formulations

Car Shampoo

<u>Ingredients:</u>	<u>% by Weight</u>
Zetesol 2056	15.0
Lumo WW 75	10.0
Zusolat 1008/85	3.0
Purton CFD	1.0
Water	75.0

Formula D 11/10

Car Wash and Wax Shampoo

<u>Ingredients:</u>	<u>% by Weight</u>
Zusolat 1008/85	10.0
Wachsemulsion 1864	10.0
Isopropanol	2.0
Water, preservative	q.s. to make 100.0
Formula D 12/2	

SOURCE: Zschimmer & Schwarz GmbH & Co.: Suggested Formulations

Vehicle Wash Detergent
(Phosphate, Powder)

Soil-Grease, oil, salt, water deposits, clay, particulates,
road film

Surface-Painted metal surface, Polymeric

Application Method-High pressure spray

Manufacture-Dry blend/Agglomeration

<u>Composition A:</u>	<u>Wt%</u>
Metso Beads 2048	20.0
*STPP	40.0
*TSP	5.0
*Sodium Carbonate	20.0
**Sodium Alkylaryl Sulfonate Powder (90%)	5.0
***Liquid Nonionic Surfactant (C9-10; 6 Moles EO)	10.0
<u>Composition B:</u>	<u>Wt%</u>
Metso Pentabead 20	30.0
*STPP	44.0
*Sodium Carbonate	10.0
CMC	1.0
**Sodium Alkylaryl Sulfonate Powder (90%)	5.0
****Octylphenoxy Polyethoxyethanol, 7-8 Moles EO	5.0
*****Octylphenoxy Polyethoxyethanol, 5 Moles EO	5.0

Use Dilution: 1.5% by weight (0.125 pounds/gallon)

Dissolve in stock tank and meter into wash system. Composition

B can be utilized in high pressure spray carwash systems and supplies adequate soil removal.

- * FMC
- ** Witco
- *** Rhone-Poulenc Rhodasurf 91-6
- **** Rhone-Poulenc Igepal CA-620
- ***** Rhone-Poulenc Igepal CA-520

Vehicle Wash Detergent
(Liquid, low foam)

Soil-Grease, oil, salt, water deposits, clay, particulates,
road film

Surface-Painted metal surface, Polymeric

Application Method: High pressure spray (700-1400 psi)

Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	79.0
Metso Beads 2048	2.0
*Sodium Polyacrylate (40%)	5.0
**Sodium Xylene Sulfonate (40%)	8.0
***Liquid Nonionic Surfactant (C9-C11; 6 Moles EO)	3.0
****Liquid Nonionic Surfactant (C9-C11; 2.5 Moles EO)	3.0

Use Dilution: 10% bw (13 oz/gallon)

- * Rhone-Poulenc Colloid 226/35 (40%)
- ** Stepan, Witco
- *** Rhone-Poulenc Rhodasurf 91-6
- **** Rhone-Poulenc Rhodasurf A-24

SOURCE: PQ Corp.: Detergent Formulation Guide

Vehicle Wash Detergent (Low pH)
(Zero Phosphate, Liquid)

Soil-Grease, oil, salt, water deposits, clay, particulates,
road film

Surface-Painted metal surface, Polymeric

Application Method-High pressure spray (700-1400 psi)

Manufacture-Mix tank with propeller spray

<u>Composition:</u>	<u>Wt%</u>
Water	51.66
Carbopol 674	0.5
D Liquid Sodium Silicate	8.1
*Acusol 445N Sodium Polyacrylate (45% solids)	1.84
Sodium Carbonate	9.1
Turbobrite Aluminosilicate	24.5
**Liquid Nonionic Surfactant	4.3

Dilute liquid detergent with water (1 gallon detergent: 64 gallons water) and deliver to high pressure spray wash system.

Mild abrasive cleaning and polishing effect of Turbobrite is extremely effective in removing oil, particulate soils, water deposits, and haze from body parts and windshield.

* Rohm & Haas

** Low Foam: Rhone-Poulenc Antarox BL-240

High Foam: Shell Chemical Neodol 23-6.5 or Neodol 25-7

Touchless Vehicle Wash Booster/Additive
(Zero Phosphate, Liquid)

Soil-Grease, oil, salt, water deposits, clay, particulates,
road film

Surface-Painted metal surface, Polymeric

Application Method-High pressure spray (700-1400 psi)

Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Turbobrite L (25 wt.% active Turbobrite Aluminosilicate Slurry)	100.0

Dilute liquid Turbobrite L at high pressure pump with water (1 gallon detergent: 128 gallons water) and deliver to high pressure spray wash system.

Mild abrasive cleaning and polishing effect of Turbobrite is extremely effective in removing oil, particulate soils (clays, carbon black, brake dust), water deposits, and haze from body parts and windshield.

Turbobrite L can be used as an additive or booster for conventional touchless, high pressure carwash or fleetwash detergents.

Or make a detergent by blending Turbobrite L with 1-2% low-foaming nonionic surfactant to make for best cleaning results. Dilute Turbobrite L/surfactant blend at high pressure pump with water (128:1).

Turbobrite L also works in waxes, polishes, and other detailing products.

SOURCE: PQ Corp.: Detergent Formulation Guide

17. Whitewall Tire Cleaners

Whitewall Tire Cleaner
(Zero Phosphate Powder)

Soil-Clay, particulate, oil, grease
Surface-Whitewall tires
Application Method-High pressure spray/brush/wipe
Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Valfor 100 Zeolite A	35.0
*Acusol 445ND Sodium Polyacrylate (92% Solids)	2.0
**Liquid Nonionic Surfactant (C9-C11; 6 Moles EO)	8.0
Sodium Alkylaryl Sulfonate	10.0
Metso Beads 2048	35.0
Sodium Carbonate	12.0
* Rohm & Haas	
** Rhone-Poulenc Rhodasurf 91-6	

Whitewall Tire Cleaner
(Phosphate Powder)

Soil-Clay, particulate, oil, grease
Surface-Whitewall tires
Application Methods-High pressure spray/brush/wipe
Manufacture-Dry blend

<u>Composition:</u>	<u>Wt%</u>
*STPP	45.0
**Liquid Nonionic Surfactant (C9-C11; 6 moles EO)	5.0
*TSP	10.0
Sodium Alkylaryl Sulfonate	10.0
Metso Beads 2048	30.0
* FMC	
** Rhone-Poulenc Rhodasurf 91-6	

Whitewall Tire Cleaner
(Liquid)

Soil-Clay, particulate, oil, grease
Surface-Whitewall tires
Application Method-High pressure spray/brush/wipe
Manufacture-Mix tank with propeller stirrer

<u>Composition:</u>	<u>Wt%</u>
Water	70.0
Potassium Hydroxide (45%)	16.0
N Clear or Star Sodium Silicate	10.0
Sodium Alkylaryl Sulfonate (60%)	2.0
*Liquid Nonionic Surfactant (C9-C11; 6 moles EO)	2.0
*Rhone-Poulenc Rhodasurf 91-6	

SOURCE: PQ Corp.: Detergent Formulation Guide

18. Miscellaneous

Aircraft Cleaner
(Reduced Phosphate, Powder)

Soil-Particulates, carbon black, petroleum oil and grease
 Surface-Aluminum, metal
 Application Method-High pressure spray (700-1400 psi)
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Pentabead 20	30.0
Valfor 100 Zeolite A	30.0
Ammonium Bifluoride	8.0
TSPP	20.0
*Sodium Alkyl naphthalene Sulfonate	8.0
**Sodium Alkylaryl Sulfonate Powder (90%)	4.0

Use Dilution: 1.5-6.0% bw (2-8 oz/gallon)

- * Rhone-Poulenc Supragil NK
- ** Witco

Note: Constant agitation is required in stock tank to keep
 Valfor 100 suspended in solution. May use 0.25% wt
 Carbopol 647 (BFGoodrich) as a suspending agent.

Aircraft Cleaner
(Phosphate, Powder)

Soil-Particulates, carbon black, petroleum oil and grease
 Surface-Metal
 Application Method-High pressure spray (700-1400 psi)
 Manufacture-Dry blend/Agglomeration

<u>Composition:</u>	<u>Wt%</u>
Metso Pentabead 20	30.0
*STPP	30.0
Ammonium Bifluoride	8.0
*TSPP	20.0
**Sodium Alkyl naphthalene Sulfonate	8.0
***Sodium Alkylaryl Sulfonate Powder (90%)	4.0

Use Dilution: 1.5-6.0% bw (2-8 oz/gallon)

- * FMC
- ** DeSoto, Inc.
- *** Witco

SOURCE: PQ Corp.: Detergent Formulation Guide

Auto Care: Interior/Exterior Rubber & Vinyl Protectant

Functions & Benefits:

Pemulan 1622:

- *Primary emulsifier for silicone oil
- *No surfactants and no solvents required equals zero VOC
- *Imparts yield value for vertical cling
- *Excellent wetting for "spray and no-wipe" applications
- *Improved durability and water-resistance

Good-Rite K-752:

- *Reduction in emulsion viscosity without loss in stability

Ingredient:

	<u>Wt%</u>
DI water	78.55
Pemulan 1622*	0.20
1000 cSt silicone oil**	20.00
DC Q2-5211***	0.50
Triethanolamine (99%)	0.25
Good-Rite K-752 (63%)****	0.50

*Emulsifier: BFGoodrich

**Protectant: DC 200 Fluid: Dow Corning

***Super-wetting agent: DC Q2-5211: Dow Corning

****Viscosity reduction: BFGoodrich

Physical Properties:

Brookfield RVT viscosity-20 rpm: 150 cP

Product pH: 5.5-6.0

Product Clarity: Opaque

Procedure:

1. Using moderate agitation (800 rpm) provided by a Lightnin' Mixer or similar variable speed unit and an impeller suitable for general mixing and blending operations, disperse or screen the Pemulan resin into the DI water. Mix the slurry for approximately 15 minutes or until the slurry is homogeneous.
2. Add the silicone fluid with good agitation.
3. Add the DC Q2-5211 super-wetting agent with moderate agitation.
4. Add the triethanolamine with moderate agitation.
5. Reduce agitation and add the Good-Rite K-752 polymer. The viscosity will drop from about 3,000 cP to <200 cP with this addition.
6. Adjust the pH with additional triethanolamine, if necessary.
7. Add fragrance and color, as desired.

SOURCE: BFGoodrich Specialty Chemicals: DET-512

Boat Polish

In addition to thickening, Carbopol resins impart yield value allowing particles, such as abrasives, to become permanently suspended. The resin also prevents "creaming" or phase separation by suspending and separating the oil droplets.

<u>Ingredient:</u>	<u>Wt%</u>
DI Water	37.80
Carbopol EZ-2 (1)	0.20
Morpholine	2.50
SF96 Silicone Fluid (350) (2)	2.00
Viscasil Fluid (10,000) (2)	1.50
Oleic Acid	2.50
Mineral Spirits	10.00
Hoechst Wax E (3)	6.00
Mineral Spirits	5.00
SF1706 Reactive Amine Polymer (2)	1.50
Kaopolite kaolin clay (4)	8.50

Physical Properties:

Brookfield Viscosity (RVT-20 rpm): 7,200 cps
 Product pH: 9.00
 Product Clarity: Opaque

Raw Material Suppliers:

- (1) BFGoodrich
- (2) General Electric
- (3) Hoechst Celanese
- (4) Kaopolite, Inc.

Procedure:

1. Disperse the Carbopol into the water by simply "dumping" it in. The polymer will wet out in a few minutes.
2. Add the morpholine, mix with good agitation. Heat to 60-65C.
3. In a separate vessel, combine the silicone fluid, Viscasil, oleic acid, and the wax in the mineral spirits. Heat to 90-95C until the wax melts and the mixture appears homogeneous. Add to the above mixture with good mixing.
4. When homogeneous, cool to 60-65C.
5. In a separate vessel, combine the mineral spirits and the reactive amine polymer. Add to the above mixture with high shear mixing.
6. Slowly add in the clay. Mix until homogeneous.

Total Actives:

Total Wax:	1.50
Total Silicone Fluid:	4.50
Reactive Amine Polymer:	2.00
Mineral Spirits:	13.00
Abrasive:	12.00

SOURCE: BFGoodrich Specialty Chemicals: DET-520

Concrete Cleaner/Degreaser

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	81.0
Sodium Tripolyphosphate	2.0
Trisodium Phosphate	1.0
Varamide A-83	6.0
Varonic DM55	10.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 8

Solids: 19.0%

Formula 937

Garage Floor Cleaner

<u>Ingredients:</u>	<u>Wt%</u>
Water	82.0
Trisodium Phosphate	8.0
Emphos PS-236	4.0
Witconate 45 Liquid	6.0

Blending Procedure:

Blend ingredients in the order listed. Allow for complete blending between additions.

Formula 941

Acid Rust Remover

<u>Ingredients:</u>	<u>Wt%</u>
Water, D.I.	81.0
Phosphoric Acid, 86%	15.0
Citric Acid	3.0
Varox 365	1.0

Blending Procedure:

Add ingredients in order shown and dissolve completely between each addition.

Typical Properties:

Viscosity, cps: 4

Solids: 16.2%

pH: 1.3

Formula 1116

SOURCE: Witco Corp.: Suggested Formulations

Concrete/Driveway Cleaners

For leaf and other tannin stains - use as is. Wet spot. Sprinkle FB Sodium Percarbonate onto spot. Scrub in and rinse with hose when spot is removed.

For Other Stains

<u>Component:</u>	<u>Wt%</u>
Soda Ash (Dense)	25
Britesil H-24	15
TSP Anhydrous	20
Burcosperse AP Powder	5
Dry Surfactant*	5
FB-Sodium Percarbonate	30

Wet spot. Sprinkle cleaner onto area. Scrub in and allow to stand. Rinse with hose.

*Sodium Lauryl Sulfate, Sodium Dodecylbenzene Sulfonate or Sodium Cocoyl Taurates can be used.

SOURCE: Burlington Chemical Co.: Suggested Formulation

Heavy Duty Concrete Cleaner (Phosphate Free) Formula 1C

	<u>Wt%</u>
Water, D.I.	75.0
EDTA, 38%	0.5
Sodium Metasilicate, Pentahydrate	2.0
Sodium Carbonate (Soda Ash)	1.5
Witcamide S-780	6.5
Witconol NP-120	1.5
Butyl Cellosolve	3.0
Mineral Spirits	4.0
KOH, 45%	2.5
Witconate SXS Liquid	1.5
Pine Oil	2.0

Blending Procedure:

Blend ingredients in order listed, mixing well after each addition.

Typical Properties:

Specific Gravity: 1.022
 Wt./Gal. lbs.: 8.52
 pH, as is: 13.18
 3 Freeze/Thaw Cycles: Passed
 1 Week @ 52C: Passed
 4 Weeks Room Temp: Passed
 Solids: 13.5%

Use Dilution: As strong as needed, depending on type of soil.

SOURCE: Witco Corp.: Formula 949

Vinyl Dressing

<u>Ingredient:</u>	<u>Wt%</u>
Part A:	
Masil EM 250 C	30.0
Deionized Water	30.0
Part B:	
Macol NP 9.5	1.5
Glycerine	1.5
Deionized Water	36.9
Sodium Benzoate	0.1

Procedure:

1. To a mixing vessel, charge the Masil EM 250 C and start gentle agitation. Slowly add the water so as not to break the emulsion.
2. In a separate mixing vessel, charge the Macol NP 9.5 and glycerine to the water. Mix with gentle agitation until all components are dissolved, and the solution is free of "fish eyes". Charge the sodium benzoate and mix until dissolved.
3. Under gentle agitation, charge Part B to Part A. Continue mixing gently to avoid air entrapment. NOTE: This formula is designed to be used "as is" as a dressing for rubber and vinyl products. If desired, UV absorbers and other components may be added to the formulation.

Formulation SV-101

Vinyl Dressing (A)

<u>Ingredient:</u>	<u>Wt%</u>
Masil EM 10,000 C	10.0
Masil EM 250 C	18.0
Macol NP 9.5	2.0
Glycerine	1.5
Barquat MB-50	0.1
Water	68.4

Procedure:

Add the silicone emulsion to a blender. Slowly add a portion of the water and agitate. Add the Macol NP 9.5 and glycerine. Mix for 10 minutes. Add the balance of the water and mix for 15 minutes.

SOURCE: PPG Industries, Inc.: Suggested Formulations

Section III

Trademarked Raw Materials

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
A-C 617A	Polyethylene	Allied
Acid Thickener	Cationic surfactant	Tomah
Acrysol ASE-108	Polyacrylate (40%)	Rohm&
Actinol FA-1	Tall oil fatty acid	Arizon
Acusol 445ND	Sodium polyacrylate (92% solids)	Rohm&
Acusol 479ND	Sodium polyacrylate	Rohm&
Adogen 66	Anti-static agent	Witco
Alipal CO-128	Anionic surfactant	Rhone-
Alipal CO-436	Anionic surfactant	Rhone-
Alkylaryl Sulfonic Acid (98%)		Witco
Alpha-Step MC-48	Alpha sulfo methyl ester	Stepan
Alpha-Step ML-40	Alpha sulfo methyl ester (37%)	Stepan
Ammonyx LO	Amine oxide	Stepan
AMP-95	Aminomethyl propanol	Angus
Amphotensid B4	Amphoteric surfactant	Zschim
Amphoteric SC	Amphoteric (35% active)	Tomah
Amphoteric TC	Hydrotrope	Tomah
Antaron FC-34	Amphoteric surfactant	Rhone-
Antarox BL-240	Liquid nonionic surfactant	Rhone-
Antarox BL-330	Liquid nonionic surfactant	Rhone-
Antarox LF-330	Surfactant	Rhone-
Aquamollin BC Powder		
Aristonate M	Petroleum sulfonate (61%)	Pilot
Aristonate M-LF	Petroleum sulfonate	Pilot
Aromatic 150	Solvent	Exxon

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Autopoon GK4004	Blend of surfactants	Zschim
Autopoon GK4008	Blend of surfactants	Zschim
Autopur WK4332	Blend of surfactants	Zschim
Avanel S-30	Anionic surfactant	PPGMaz
Avanel S-70	Sodium linear alkyl polyether	PPGMaz
Avanel S-74	Anionic surfactant	PPGMaz
Barlox 12	Amine oxide (30%)	Lonza
Barquat MB-50	Quaternary ammonium compound	Lonza
Biosoft D-62	Sodium alkyl benzene sulfonate(60%)	Stepan
Biosoft S-100	Alkylbenzene sulfonic acid, linear	Stepan
Biaterge AS-40	Sodium olefin sulfonate (40%)	Stepan
Biaterge PAS-8S	Primary alkane sulfonate (40%)	Stepan
BJ-120 Liquid Sodium Silicate		PQ
Brij 96	Surfactant	ICI
Britesil C20	Hydrous sodium polysilicate	PQ
Britesil H20	Hydrous sodium polysilicate	PQ
Britesil H24	Hydrous sodium polysilicate	PQ
Burcene 100		Burlin
Burco BSGH-270	Proprietary textile auxiliary	Burlin
Burco HCS-50NF	Proprietary textile auxiliary	Burlin
Burco NPS-225	Proprietary textile auxiliary	Burlin
Burco NPS-816	Proprietary textile auxiliary	Burlin
Burco SZS	Proprietary textile auxiliary	Burlin
Burcol LAF-6	Proprietary textile auxiliary	Burlin

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Burcol 117	Proprietary textile auxiliary	Burlin
Burcolite BSGH-255		Burlin
Burcosolv TM	Water soluble solvent mixture	Burlin
Burcosperse AP Powder	Sodium polyacrylate	Burlin
Burcosperse LP	Sodium polyacrylate solution	Burlin
Burcosperse SP-60	Sodium polyacrylate	Burlin
Burcotase LL-100	Proprietary detergent enzyme	Burlin
Burcotase EP-60	Proprietary detergent enzyme	Burlin
Burcotase SL-160	Proprietary detergent enzyme	Burlin
Burcoterge DG-40	Detergent concentrate	Burlin
Burco TME	Proprietary textile auxiliary	Burlin
Burcotrope 1250		Burlin
Burcowhite BBH-20		Burlin
Burdac-114		
Butyl Carbitol	Industrial solvent	UnCarb
Butyl Cellosolve	Ethylene glycol monobutyl ether	UnCarb
Calamide C	Coconut derived amide	Pilot
Calamide CW-100	Coconut diethanolamide 100%	Pilot
Calamide CWT	Super amide	Pilot
Calamide SM	Non-DEA liquid amide	Pilot
Calfax DB-45	Sodium alkyl (branched) diphenyl oxide disulfonate 45%	Mona
Calfax 10L-45	Sodium alkyl (linear) diphenyl oxide disulfonate 45%	Mona
Calfoam EA-603	Liquid detergent	Pilot

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Calfoam ES-303	Sodium lauryl ether sulfate (30%)	Pilot
Calfoam SLS-30	Sodium lauryl sulfate 30%	Pilot
Calimulse PRS	Emulsifier	Pilot
Caloxylate N-9	Nonyl phenol ethoxylate (9 Mole EO)	Pilot
Calsoft F-90	Linear alkylate sulfonate	Pilot
Calsoft L-40	Sodium linear alkyl benzene sulfonate liquid 40%	Pilot
Calsoft L-60	Sodium linear alkyl benzene sulfonate paste 60%	Pilot
Calsoft LAS-99	Linear alkyl benzene sulfonic acid 99%	Pilot
Calsoft T-60	TEA linear alkyl benzene sulfonate 60%	Pilot
Calsuds A	Conc. blend of anionic detergents and amides	Pilot
Calsuds CD-6	Modified coconut diethanolamide 100%	Pilot
Calsuds 81	Conc. blend of anionic detergents and amides	Pilot
Carbitol Solvent	Industrial solvent	UnCarb
Carbopol 672	Thickening agent	BFGood
Carbopol 674	Thickening agent	BFGood
Carbopol 676	Thickening agent	BFGood
Carbopol 691	Suspension aid	BFGood
Carbopol 934	Thickening agent	BFGood
Carbopol 940	Thickening agent	BFGood
Carbopol 941	Thickening agent	BFGood
Carbopol ETD 2623	Resin viscosity modifier	BFGood
Carbopol ETD 2691	Resin viscosity modifier	BFGood

RAW MATERIALS	CHEMICAL DESCRIPTION	SOURCE
Carbopol EX-473 (30%)	Viscosity modifier	BFGood
Carbopol EZ-2	Viscosity modifier	BFGood
Cardis 36 Wax	Oxidized microcrystalline wax	Petrol
CDB Clearon	Chlorinated isocyanurate	Olin
Colloid 225/35	Polyacrylate (40%)	Rhone
Colloid 226/35	Polyacrylate (40%)	Rhone
Contraspum 300	Glycol ether defoamer	Zschim
Cublen D50		
DC Q2-5211	Super-wetting agent	DowCor
Decanol		
Dequest 2000	Organophosphorous product	Monsan
DeSonic LFD-97	Nonionic surfactant	DeSoto
DeSonic 5N	Nonionic surfactant	DeSoto
DeSonic 9N	Detergent/degreaser	DeSoto
DeSonic 11N	Nonionic surfactant	DeSoto
DeSonic 81-6	Nonionic surfactant	DeSoto
DeSophos 5AP	Phosphate ester	DeSoto
Diatomaceous Earth		Kaopol
D Liquid Sodium Silicate		PQCorp
Dipropylene Glycol Monoethyl Ether Solvent		Dow or Arco
Dodigen 226		
Dowanol DPM	Glycol ether	Dow
Dowanol DPnB	Glycol ether	Dow

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Dowanol EB	Ethylene glycol n-butyl ether	Dow
Dowanol PM	Propylene glycol methyl ether	Dow
Dowanol PnB	Glycol ether	Dow
Dowanol TBA	Glycol ether	Dow
Dowanol TPM	Tripropylene glycol methyl ether	Dow
Dow Corning 20 Release Coating		DowCor
Dowfax 3B2	Sodium n-decyl diphenyloxide disulfonate (45%)	Dow
Dowicide A	Sodium o-Phenylphenate	Dow
Dow 200 Silicone Fluid (1000 cSt)		DowCor
Dowfax 2A1	Sodium dodecyl diphenyloxide disulfonate (45%)	Dow
Dowfax 3B2	Anionic surfactant	Dow
Dresinate 91	Rosin soap	Hercul
E Liquid Sodium Silicate		PQ
Emcol 4500	Wetting agent	Witco
Emcol 6744	Surface-active agent	Witco
Emersol 213	Oleic acid	Henkel
Emphos PS-236	Phosphate ester surfactant	Witco
Emphos PS-331	Phosphate ester surfactant	Witco
Emphos 5AP	Phosphate ester surfactant	Witco
Emulsifier Four HF	Dialkyl quaternary (75% active)	Tomah
Emulsifier 827	Mixed dialkyl quaternary (75% act)	Tomah
Emulsion C340		Tomah
Epsom Salt		PQ

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Ethylene Glycol	n-Butyl Ether Solvent	Dow or Union Carb
Euperlan PK-771	Pearlizing agent (47%)	Henkel
Foam Booster 14	Defoamer	Tomah
Gafac RE-40	Anionic surfactant	Rhone
Gafamide CDD 518	Ethanolamide	Rhone
Genagen LAB	C12C14 alkyldimethyl betaine	Hoechs
Genapol OA-80	Alcohol ethoxylate	Hoechs
Genapol UD-030	C11 oxo ethoxylate (3 moles EO)	Hoechs
Genapol UD-080	Alcohol ethoxylate	Hoechs
Genapol ZRO liquid	Alkyltriglycol ether sulfate soln	Hoechs
Genapol 2908	Alcohol ethoxylate	Hoechs
Georgia Marble White #8	calcium carbonate	GaMarb
Gluconic Acid Solution (50%)		Ashlan
Glucopon 425CS	C8-16 alkyl polyglycoside (50%)	Henkel
Glycol Ether DPM		
Glycol Ether PM		
Good-Rite K-752	Viscosity reducer	BFGood
Good-Rite K-7058	5800 MW polyacrylic acid	BFGood
GP-RA-159 Silicone Polish Additive		Genes
GP-121 Silicone Polish Additive		Genes
GP-227 Silicone Surfactant Solution		Genes

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
H-7892 d-Limonene		Aryles
Hampene 100	Tetrasodium EDTA	Grace
Hexyl Carbitol	Industrial solvent	UnCarb
Hitec E-515		Ethyl
Hoe S3924		Hoechs
Hoechst Wax E	Wax	Hoechs
Hoechst Wax S	Wax	Hoechs
Hostapur OS Liquid		Hoechs
Hostapur SAS60	Secondary alkane sulfonate	Hoechs
Hyamine 10X	Quaternary ammonium compound	Lonza
Hypure N	Secondary hypochlorite, 10% soln	
Igepal CA-520	Octylphenoxy polyethoxyethanol, 5 EO	Rhone-
Igepal CA-620	Octylphenoxy polyethoxyethanol, 8 EO	Rhone-
Igepal CA-630	Octylphenoxy polyethoxyethanol, 9 EO	Rhone-
Igepal CA-720	Octylphenoxy polyethoxyethanol, 12-13 moles EO	Rhone-
Igepal CO-430	Nonionic ethoxylate surfactant	Rhone-
Igepal CO-530	Alkoxylated linear alcohol nonionic surfactant (low foam)	Rhone-
Igepal CO-630	Nonylphenoxy polyethoxyethanol, 9-10 moles EO	Rhone-
Indopol H-100	Viscous polybutene	Amoco
Inhibitor 4000	Alkanolamine borate	Zschim
Isopar K	Isoparaffin solvent	Exxon
Isopar M	Isoparaffin solvent	Exxon

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Kaopolite	Kaolin clay	Kaopol
Kaopolite SF	Anhydrous aluminum silicate	Kaopol
Kaopolite 1152	Anhydrous aluminum silicate	Kaopol
Kasil #1	Potassium silicate	PQ
Kasil #6	Potassium silicate	PQ
Kathon CG	Fungicide (biocide)	Rohm&
Kelzan	Xanthan gum	Kelco
Kerr-McGee Mineral Seal Oil		Kerr-
Komperlan KD		
Larostat 88	Antistat	PPGMaz
Larostat 264A	Antistat	PPGMaz
Larostat 519	Antistat	PPGMaz
Laundry Additive LA-5		Tomah
Lonzabac-1230		Lonza
Lumo WW 75		Zschim
Lumorol 4154	Surfactant blend	Zschim
Lumorol 4192	Surfactant blend	Zschim
Lytron 295	Opacifier. Polystyrene emulsion	Morton
Macol NP 9.5 & NP-11 & OP10SP & TD-3 & TD-12 & 2LF & 48 & 5100	Polyoxyethylene fatty ether	PPGMaz
Mafo CSB	Amphoteric surfactant	PPGMaz
Mafo 13 MOD 1	Amphoteric surfactant	PPGMaz

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Makon 10	Alkyl phenol ether	Stepan
Makon 12	Alkyl phenol ether	Stepan
Maphos 58	Phosphate ester	PPGMaz
Maphos 60A	Phosphate ester	PPGMaz
Maphos 8135	Phosphate ester	PPGMaz
Masil EM250C & EM10,000C & SF-10 & SF-100 & SF-1,000 & 123	Silicone fluids	PPGMaz
Maslip 500 & 501A & 501 Base	Synthetic lubricant additives	PPGMaz
Mazamide SS-10 & 65 & 80 & 1281	Specialty alkanolamides	PPGMaz
Mazawet 77	Surfactant	PPGMaz
Mazon RI 4A & RI 6 & RI 8A & RI 8B & 98	Specialty proprietaries	PPGMaz
Mazox LDA	Fatty amine oxide	PPGMaz
Mazu DF 210 SX	Defoamer	PPGMaz
Medialan KA Conc.		
Metso Beads 2048	Anhydrous sodium metasilicate	PQ
Metso Pentabead 20	Sodium metasilicate pentahydrate	PQ
Miranol C2M-SF Conc.	Disodium cocoamphodipropionate	Rhone-
Miranol JEM Conc.(34%)	Sodium mixed C8-amphocarboxylate	Rhone-
Monacor BE	Corrosion inhibitor	Mona
Monacor 4000	Corrosion inhibitor	Mona
Monalube 110 & 205 & 210 & 215 & 220 & 225 & 310 & 315 & 320 & 325 & 605 & 610	Synthetic lubricants	Mona
Monamid 150-ADD	Cocamide DEA	Mona

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Monamine CF-100M & I-76	2:1 fatty alkanolamides	Mona
Monamulse dL-1273	Proprietary emulsifier/solubilizers	Mona
Mona NF-10 & NF-20	Surfactants	Mona
Monamulse TRP & 653-83D	Liquid emulsifier and solubilizer	Mona
Monaquat ISIES	Isostearyl ethyldimonium etho-sulfate	Mona
Monaquat TG	Quaternary phospholipid compound	Mona
Monasil PCA		Mona
Monaterge ALX-100S	Cocamide DEA & DEA-Dodecylbenzene-sulfonate & diethanolamine	Mona
Monaterge 779	DEA-Laureth sulfate	Mona
Monateric CM-36S	Sodium cocoamphoacetate	Mona
Monateric CyNa-50	1-Hydroxyethylene-2-caprylimid-azoline (50% active)	Mona
Monateric EH	Mild amphoteric detergent/emulsifier	Mona
Monatrope 1250		Mona
M-Pyrol	n-Methyl-2-pyrrolidone	ISP
Mulsifan K326 Spezial	Emulsifier for solvents	Zschim
Mulsifan RT1	Fatty acid ethoxylate. Emulsifier.	Zschim
Nacconol 90G	Linear alkylbenzene sulfonate(LAS)	Stepan
N Clear Sodium Silicate	Sodium metasilicate	PQ
Nekal WT-27	Anionic wetting agent	Rhone-
Neodol 1.5	Ethoxylate. Linear primary alcohol	Shell

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Neodol 23-6.5	C12-13 linear alcohol.6.5 moles EO	Shell
Neodol 25-3	C12-15 linear alcohol.3 moles EO	Shell
Neodol 25-7	C12-15 linear alcohol.7 moles EO	Shell
Neodol 25-12	Linear primary alcohol	Shell
Neodol 91-6	Linear primary alcohol. Ethoxylate	Shell
Ninol 11-CM	Coconut diethanolamide, modified	Stepan
Ninol 30-LL	Alkylolamide	Stepan
Ninol 40-CO	Cocamide DEA	Stepan
Paroil 160	Chlorinated paraffin	Dover
Pemulen 1622	Resin	BFGood
Petro BA Liquid & BAF Liquid & BAF Powder & LBA Liquid & LBA Powder & ULF Liquid & 22 Powder	Anionic surfactant/dispersant	DeSoto
Phosfetal 201	Phosphoric acid ester	Zschim
Phospholipid EFA	Lindeamidopropyl PE-Dimonium chloride phosphate	Mona
Pilot SXS-40	Sodium xylene sulfonate 40%	Pilot
Plurafac C-17	Alkoxylated fatty alcohol	BASF
Plurafac D-25	Linear alcohol ethoxylate. MW:930	BASF
Polytergent S-305LF	Alkoxylated linear alcohol nonionic surfactant (low foam)	Olin
PQ Epsom Salt		PQ
Prifac 2922	Lauric acid	Uniche
Produkt 2058	Fatty alcohol fatty acid ester	Zschim
Propetal 99	Alkyl polyalkylene glycol ether	Zschim

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Propetal 241	Alkyl polyalkylene glycol ether	Zschim
Propetal 281	Alkyl polyalkylene glycol ether	Zschim
Purton CFD	Fatty acid alkanolamide	Zschim
PVP K-15	Polyvinylpyrrolidone polymer	Rhone-
Renex 20	Surfactant	ICI
Rewoteric AM B-14	Grease cutter & foam booster	Witco
Rewoteric AM B-15 & AM DML 35 & AM HC & AM KSF 40 & AM TEG & AMV	Surfactants	Witco
Rhodafac RA-600	Linear alcohol ethoxylate	Rhone-
Rhodafac RE-600	Phosphate ester	Rhone-
Rhodafac RE-610	Phosphate ester	Rhone-
Rhodasurf A-24	Liquid nonionic surfactant. 2.5 moles EO	Rhone-
Rhodasurf LA-7	Liquid nonionic surfactant. 7-9 moles EO	Rhone-
Rhodasurf LA-9	Liquid nonionic surfactant. 9 moles EO	Rhone-
Rhodasurf LA-12	Liquid nonionic surfactant. 12 moles EO	Rhone-
Rhodasurf 91-6	Liquid nonionic surfactant. 6 moles EO	Rhone-
Rhodaterge SMC	Cleaner concentrate	Rhone-
Rhodopol 23	Xanthan gum	Rhone-
Rhodopol 50MD	Xanthan gum	Rhone-
Richamide 5725		Richar
RU Liquid Sodium Silicate corrosion inhibitor		PQ

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
SF96 Silicone Fluid	Polydimethyl silicone fluid	GE
SF1705 Reactive Silicone Polymer		GE
SF1706 Reactive Silicone Polymer		GE
Shellflex 213	Rubber process oil	Shell
Shell Sol 135	Solvent	Shell
SM2133 Silicone Emulsion		GE
SM2135 Silicone Emulsion		GE
SMA-2625 Resin	Copolymer resin	Arco
S-Maz 80	Sorbitan fatty ester	PPGMaz
Snow Floss	Mineral filler	JM
Sodium Alkylaryl Sulfonate Powder (99%)		Witco
Sodium Alkyl naphthalene Sulfonate		DeSoto
Sodium Bicarbonate (Grades 1 & 5)		Church
Sodium Carbonate		FMC
Sodium Dichloroisocyanurate, 2H ₂ O		Olin
Sodium Tripolyphosphate		FMC
Sodium Xylene Sulfonate (40%)		Stepan, Witco
Sokalan CP5 & HP22		
Standamid PD	Cocamide DEA	Henkel
Standapol A	Anionic surfactant. Ammonium lauryl sulfate (30%)	Stepan
Standapol ES-3	Anionic surfactant. Sodium lauryl ether sulfate (30%)	Stepan
Star	Sodium silicate 40Be'	PQ
Starso	Liquid sodium silicate	PQ
Steol CS-330	Alcohol ether sulfate	Stepan

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Stepanol WA-Extra	Hydrotrope	Stepan
Stoddard Solvent		Exxon
STPP		FMC
Sulfetal 4069	Fatty alcohol sulfate. Anionic surfactant	Zschim
Sulfetal 4105	Fatty alcohol sulfate. Anionic surfactant	Zschim
Sulfonate OA5	Wetting agent	Tennes
Super Floss	Diatomaceous earth	JM
Supragil NK	Sodium alkyl naphthalene sulfonate	Rhone-
Surfonic N-150	Surface active agent	Texaco
TEA Lauryl Sulfate		Rhone-
Tergitol NP	Nonoxynol	UnCarb
Thermphos		Hoechs
Thermphos NW		Hoechs
Tinopal 5BM	Fluorescent whitening agent	Ciba-
Tomah Alkali Surfactant	Amphoteric (35% active)	Tomah
Tomah Amphoteric L	Mild surfactant	Tomah
Tomah AO-14-2	Ether amine oxide (50% active)	Tomah
Tomah AO-728 Special	Amine oxide-high foaming (50% act)	Tomah
Tomah Q-14-2	Quaternary	Tomah
Tomah Q-17-2	Quaternary	Tomah
Trilon A Liquid		Zschim
Triton DF-16 & N-101 & X-45	Nonionic surfactants	Rohm

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Turbobrite	Aluminosilicate	PQ
Turbobrite L	Aluminosilicate slurry	PQ
Tween 40	Polysorbate 40	ICI
Tylose CBR 10000		
Ubato1 TR1138		
Valfor 100	Zeolite A builder	PQ
Van Gel B & C & ES & O	Magnesium aluminum silicates	RTVan
Vanseal NACS-30	Sodium lauroyl sarcosinate	RTVan
Vanseal NALS-30		RTVan
Varamide A-10 & A-12 & A-83 & MA-1	Detergent alkanolamides	Witco
Varonic DM-55 & K205 & T202 & T202SR	Nonionic wetting agents	Witco
Varox 365 & 1770	Wetting agents	Witco
Varquat 50MC	Specialty quaternary, germicide	Witco
Veegum & Veegum T	Magnesium aluminum silicates	RTVan
Versene 100 & 220	Chelating agents	Dow
Viscasil Fluid (10,000)	Silicone	GE
Wachsemulsion 1864		Zschim
Witcamide S-780 & 128T & 6445	Alkanolamide surfactants	Witco
Witco 1298S		Witco
Witco 1298SA	Soft acid	Witco
Witcolate ES-3 & LES-60A & LES-60C & SE-5 & WAC-LA & 2310	Sulfated surfactants	Witco

RAW MATERIAL	CHEMICAL DESCRIPTION	SOURCE
Witconate AOS & SXS & 30DS & 45 Liquid & 60T Liquid & 1240 & 1260 Slurry	Surfactants	Witco
Witconol NP-100 & NP-120	Detergents & degreasers	Witco
Wessalith P	Zeolith P	
Yarmor 302	Pine oil	Hercul
Zetesol 2056	Fatty alcohol ether sulfate	Zschim
Zetesol NL	Fatty alcohol ether sulfate	Zschim
Zusolat 1005/85	Alkyl polyethylene glycol ether	Zschim
Zusolat 1008/85	Alkyl polyethylene glycol ether	Zschim
2.1r Potassium silicate (39%)		PQ
2.4r Sodium silicate (52%)		PQ

Section IV

Suppliers' Addresses

Allied-Signal, Inc.
P.O. Box 2332R
Morristown, NJ 07962
(201)-455-2000/(800)-526-0717

Amoco Chemical Co.
200 E. Randolph Dr.
Chicago, IL 60601
(312)-856-3200/(800)-621-8888

Angus Chemical Co.
2211 Sanders Rd.
Northbrook, IL 60062
(708)-498-6700/(800)-323-6209

Arco Chemical Co.
3801 West Chester Pike
Newtown Square, PA 19073
(215)-359-2000

Arizona Chemical Co.
1001 E. Business Hwy 98
Panama City, FL 32401
(904)-785-6700/(800)-526-5294

Ashland Chemical Co.
P.O. Box 2219
Columbus, OH 43216
(614)-889-3333/(800)-848-7485

BASF Corp.
100 Cherry Hill Rd.
Parsippany, NJ 07054
(201)-316-3000/(800)-526-1072

Burlington Chemical Co. Inc.
P.O. Box 111
615 Huffman Mill Rd.
Burlington, NC 27215
(919)-584-0111/(800)-672-5888

Ciba-Geigy Corp.
7 Skyline Drive
Hawthorne, NY 10532
(914)-374-4700/(800)-431-1900

DeSoto Inc.
1700 S. Mt. Prospect Rd.
Des Plaines, IL 60018
(312)-391-9000

Dover Chemical Corp.
W15 & Davis
P.O. Box 40
Dover, OH 44622
(800)-321-8805

Dow Chemical USA
Midland, MI 48674
(800)-258-CHEM

Dow Corning Corp.
Box 0994
Midland, MI 48686
(517)-496-4000

Ethyl Corp.
451 Florida
Baton Rouge, LA 70801
(504)-388-7556/(800)-535-3030

Exxon Chemical Americas
13501 Katy Frwy
Houston, TX 77079
(713)-870-6000/(800)-231-6633

FMC Corp.
2000 Market St.
Philadelphia, PA 19103
(215)-299-6000/(800)-526-3649

GE Silicones
260 Hudson River Rd.
Waterford, NY 12188
(518)-237-3330/(800)-255-8886

Genesee Polymers Corp.
Fenton Rd./P.O. Box 7047
Flint, MI 48507
(313)-238-4966

Georgia Marble Co.
1201 Roberts Blvd.
Kennesaw, GA 30144
(404)-421-6500

B.F. Goodrich Co.
9911 Brecksville Rd.
Brecksville, OH 44141
(216)-447-5000/(800)-331-1144

W.R. Grace & Co.
55 Hayden Ave.
Lexington, MA 02173
(617)-861-6600

Henkel Corp.
5325 S. Ninth Ave.
LaGrange, IL 60525
(708)-530-7300/(800)-543-7370

Hercules Inc.
Hercules Plaza
Wilmington, DE 19894
(800)-247-4372

Hoechst Celanese Corp.
801 Water St.
Portsmouth, VA 23704
(804)-393-3100/(800)-368-2822

ICI Specialties
Concord Pike & New Murphy Rd.
Wilmington, DE 19897
(302)-886-3000/(800)-822-8215

Johns-Manville
Ken Caryl Ranch
Denver, CO 80217

Kaopolite, Inc.
2444 Morris Ave.
Union, NJ 07083
(908)-789-0609

Kelco Division
Merck & Co., Inc.
8355 Aero Drive
San Diego, CA 92123
(619)-292-4900

Kerr-McGee Chemical Corp.
Kerr-McGee Ctr.
P.O. Box 25861
Oklahoma City, OK 73125
(405)-270-1313/(800)-654-3911

Lonza Inc.
1717 Rte 208
Fair Lawn, NJ 07410
(201)-794-2400/(800)-777-1875

Mona Industries Inc.
76 E. 24 St.
P.O. Box 425
Paterson, NJ 07544
(201)-345-8220/(800)-553-6662

Monsanto Chemical Co.
800 N. Lindbergh Blvd.
St. Louis, MO 63167
(314)-694-1000/(800)-325-4330

Morton International
100 N. Riverside Plaza
Chicago, IL 60606
(312)-807-2000/(800)-367-3318

Olin Corp.
120 Long Ridge Rd.
P.O. Box 1355
Stamford, CT 06904
(203)-356-2000/(800)-243-9171

Petrolite Corp.
6910 E. 14 St.
Tulsa, OK 74112
(918)-836-1601

Pilot Chemical Co.
11756 Burke St.
Santa Fe Springs, CA 90670
(310)-723-0036

PPG/Mazer
One PPG Place
Pittsburgh, PA 15272
(412)-434-3131/(800)-243-6774

PQ Corp.
P.O. Box 840
Valley Forge, PA 19482
(215)-293-7200

Quest International Fragrances
400 International Drive
Mount Olive, NJ 07828
(201)-691-7100

Rhone-Poulenc
Prospect Plains Rd.
Cranbury, NJ 08512
(609)-860-4000/(800)-626-2613

Richardson Co.
2400 East Devon Ave.
Des Plaines, IL 60018

Rohm & Haas Co.
Independence Mall West
Philadelphia, PA 19105
(215)-592-3000

Shell Chemical Co.
P.O. Box 2463
Houston, TX 77252
(713)-241-6161

Stepan Co.
22 W. Frontage Rd.
Northfield, IL 60093
(708)-446-7500/(800)-745-7837

Tennessee Chemical Co.
3400 Peachtree Rd NE
Atlanta, GA 30326
(404)-239-6700/(800)-241-1912

Texaco Chemical Co.
3040 Post Oak Blvd.
Houston, TX 77056
(713)-961-3711

3M
3M Center
St. Paul, MN 55144
(612)-733-5454

Tomah Products, Inc.
1012 Terra Drive
Milton, WI 53563
(608)-868-6811/(800)-441-0708

Unichema Chemicals Inc.
4650 S. Racine Ave.
Chicago, IL 60609
(312)-376-9000/(800)-833-2864

Union Carbide Corp.
39 Old Ridgebury Rd.
Danbury, CT 06817
(203)-794-2000

R.T. Vanderbilt Co., Inc.
P.O. Box 5150
30 Winfield St.
Norwalk, CT 06856
(203)-853-1400/(800)-243-6064

Witco Corp.
520 Madison Ave.
New York, NY 10022
(212)-605-3941/(800)-634-4010

Zschimmer & Schwarz
Max-Schwarz-Strabe 3-5
D-56112 Lahnstein/RH
D 26 21/120